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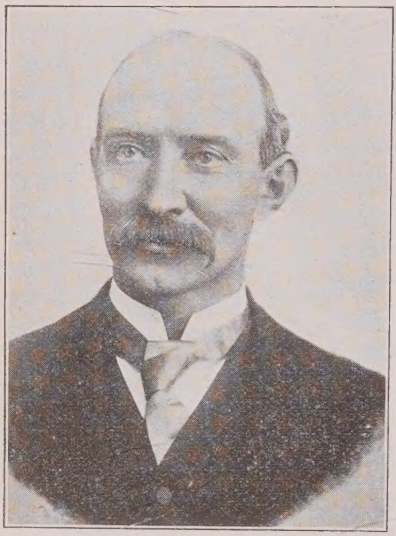
IN MEMORIAM.

JOHN PETER FISHER.

John Peter Fisher, game expert of the California Fish and Game Commission, with headquarters in San Francisco, dropped dead while hunting in the marshes near Los Banos, on Sunday, November 26, 1916. Apparently there was no presentiment of death, as he left home in his usual health and was as cheerful and jocular as ever.



Mr. Fisher was a native of San Francisco, being of a pioneer family. His father came to California in 1848, and settled in El Dorado County in the early sixties. Mr. John P. Fisher married Miss Summerfield of El Dorado County, and two children were born to them: a daughter, who died when quite young, and a son, whose tragic death by accidental shooting occurred when the young man was but eighteen years of age.

John P. Fisher was a lover of nature. He knew the woods, the birds, and the animal life of northern California as thoroughly as few men have come to know them. He was an exceptionally well-informed man. Always reading, observing and studying, he was able to thoroughly discuss a wide range of subjects. He held many positions of trust, where an expert knowledge of men and conditions was essential. For many years he was connected with the timber interests of El Dorado and adjoining counties, and the people of El Dorado County twice elected him to the position of county clerk. He was prominent as a national guardsman, and as such was recognized as one of the best shots in the United States, his possessions including many medals and trophies won in open competition.

He was known and loved for his genial disposition. Few men could number the sincere friendships accorded to him. No matter how he may have felt; no matter his secret troubles or sorrow, it was always a smile and a cheerful word from John P. Fisher.—W. A. Gett.

PAUL SMITH.

The following fitting words were spoken at the funeral of Paul Smith, one of the commission's trusted deputies, by Assistant Executive Officer J. S. Hunter:

"It has been my privilege to be associated for several years with the man whom we today have come to pay our last tribute of love and respect. I want to emphasize that it has been a privilege, for it is seldom that in all the multitude of people we come in contact with each day, that we find one in whom we can entrust every confidence as we could in him.

"In my association with him it was a pleasure to study the true nobleness of character, sincere integrity and high regard for duty that permeated his entire being. No duty was too severe, no task too hard; never complaining, always giving the best that was in him, his life was such that we can take from it a lesson that will make us all better men.

"To the wife and baby girl I would leave this word: Do not think of him as dead, but as one who has left all trials and troubles behind and who now rests where there are no sorrows, no partings, but, in their place, eternal peace. His memory is with you. Take consolation from the fact that his life was upright, his character sterling, his every act above reproach. He lives in your memory and in the memory of his friends and those who loved him."

CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

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AN UNFAIR ATTITUDE ON GAME LAWS.

By FRANK B. HOFFMAN.

I recently attended a trial held before a justice of the peace in one of our mountain districts, the defendants, three in number, being charged with a violation of the game law. As to the result of the trial in as far as it affected the defendants, I have nothing to say, but I was forcibly impressed and immeasurably shocked at the utter lack of respect shown by some of those present for the officers of the court, and the openly expressed sentiment against the arresting officials. The idea seemed to prevail, as it does in other small communities, that because of the nature of the case the proceedings were to be something on the order of a vaudeville performance, and at least 50 per cent of those in attendance showed by their attitude that they were there to contribute their share toward the entertainment. I will not dwell upon this case, except to remark that instances of this kind have a demoralizing influence upon the community in which they occur, for contempt for, and disregard of one law and its representatives, soon leads to contempt for another law and the officers appointed to enforce it.

I do not attempt a defense of the game warden, for neither he nor his position need defending, but I wish to register a vigorous protest against the unfair attitude assumed by a certain element of society toward these capable representatives of one of the greatest movements ever inaugurated for the benefit of the present and future generations. The populace turns out en masse to assist other officers in the capture of wrongdoers, and even the vile desecrator of the sacred hen roost is considered legitimate prey, all citizens, high and low, lending their best effort to aid in his apprehension. The officer who effects his capture is publicly lauded for his zeal and bravery, and where his office is elective, he is unanimously returned to office because of his record as an efficient officer. But because of some strange inconsistency in the human makeup, we place the game warden in a little niche by himself and deny him the whole-hearted support that is the due of every officer, regardless of which branch of the law he represents.

The admirable and conscientious manner in which the majority of these men perform the duties assigned to them, speaks well of their physical and moral courage, for it is a lamentable fact that in some districts the sentiment against them is so hostile that they must possess these qualities to a high degree.

Even the hardened criminal recognizes the necessity of law and order, although he may look with disfavor upon the laws which affect his particular line of endeavor, and while he will resort to any measure to avoid capture, once he realizes that resistance is useless, he submits

to arrests and entertains nothing but the friendliest feeling toward his captor. But in most cases, violators of the game law make their arrest the basis of a bitter hatred for the man who brings them to task, considering it in the light of a personal affair between themselves and the game warden, seeming to forget that he is but an instrument of society. A certain calibre of chronic offenders voice their hostile sentiments in very forceful language, endeavoring by threat and presentation of a warlike front to intimidate the resident game deputies. It is interesting to note the source from whence these threats emanate. In every case, the salient features of the physiognomy of the one who utters them proclaims the fact that his mental peregrinations do not extend beyond bounds usually referred to as "narrow."

In some districts it is a difficult matter to secure a jury who will deal fairly with the people in these "game trials," and men of high standing, who consider themselves law-abiding and upright members of their community, will resort to every subterfuge to avoid jury service in these instances. Sometimes they are moved to this as an act of business or social diplomacy or because of the fear of incurring the ill will of others. Others, who can and will qualify as jurors in the trial of any other case, seem, upon these occasions, unable to adjust their mental processes in a manner which will enable them to lay aside their personal feelings and opinions.

Citizenship carries with it certain responsibilities, which, in all fairness to ourselves and our fellow man, we must not shirk. I consider jury service one of the most solemn and high duties we are called upon to perform, and while it is, at best, a disagreeable duty, we can not deliberately avoid it without feeling that we are shirkers. It is discouraging to the game wardens, when, after the conscientious performance of their duty, they are denied support from the quarter from which they naturally expect it. I refer particularly to the lack of cooperation in some districts upon the part of the district attorney and other county officials. However, if I am correctly informed, it is possible to proceed with the prosecution of a case without the assistance of these officers, and I believe it would be an excellent thing could these trials be held before any justice of the peace in the county, when, owing to the strong sentiment against game protection, it is impossible to secure a fair-minded jury in the locality where the offense is committed.

Our game is one of our most valuable assets. It is the means of bringing to our state thousands of dollars annually which otherwise would go to states more favored in the line of game, and laying aside all other considerations, from this standpoint alone it is to the interest of every man and woman within the boundaries of our state to lend their hearty support to any movement that has for its objective the preservation of our game. Society has appointed representatives to enact its laws, and as long as these enactments remain upon the statute books they must be observed and upheld by all, and the ones who are delegated to enforce them, instead of being anathematized and condemned, should receive the moral and active backing of every citizen.

Every true sportsman should cultivate the acquaintance of the local representative of the Fish and Game Commission in the district where he usually hunts or spends his vacation. He will find the deputy a good man to know. As a general rule he is a veritable encyclopedia of

information pertaining to things that are of interest to all lovers of the great out-of-doors. He can tell one where the best hunting and fishing is to be had; point out the best camp ground, and be useful in innumerable small ways that I am sure will be highly appreciated.

I hope to see the day in the not distant future when the true status of our game wardens will be firmly established in the public mind, and the warden will be accorded the respect to which the dignity of his office entitles him.

Meet him on the open ground of good fellowship; extend to him the hand of welcome when he favors your camp with a visit, and as he is usually the possessor of a pleasing personality, he will, if afforded an opportunity, win your good will and friendship.

STRIPED BASS FISHING.

By C. M. Boutan.

My first experience angling for striped bass was sixteen years ago. After several fishing trips to San Leandro Bay, where I caught nothing but sting-rays, I succeeded in hooking a two-pound bass in San Pablo marsh near where the city of Richmond now stands.

The clam was the only bait used at that time. The preparation of a clam for a bait consisted in taking it out of the shell and splitting the neck lengthwise, the idea being to make a pocket of the neck, for the clam belly is soft and comes off the hook easily when cast. The hook was run through the little hard teat on the belly, then through the belly and twice through the neck lengthwise.

Our fishing was confined to the sloughs and good catches on some occasions were made.

In July, 1901, Al. Wilson perfected a bass spoon which he brought to San Pablo to try, and it was my good fortune to be there fishing at the time and to see the results. Mr. Wilson informed me that the spoons would be on the market shortly, and upon securing one I made a hasty trip to try it out. Large numbers of bass were occasionally caught with this spoon, both in the sloughs and on flats outside in San Pablo Bay. But the striped bass is a queer fish and on some days it would not strike the spoon. The fish were small, ranging from one to four pounds, but occasionally a larger one was landed.

A couple of years later some men tried trolling for bass in Raccoon Straits and secured a nice catch, so several of us went over to try our luck. Fishing was so good that we formed a club known as the "Pacific Striped Bass Club" and purchased an ark, which we still maintain at Belvedere. There were two distinct runs of bass in that neighborhood, one in March and April, the other in September and October. Seldom was a fish caught under five pounds and from that up to fourteen pounds, with a few as large as twenty pounds. Two men generally fished together, using the "armstrong" motor. Rod holders were clamped to the sides of the boat to hold the rods. It was ideal fishing, with plenty of excitement, especially when two fish were hooked at the same time, which often happened. The fishing was mostly done close to the rocks.

A good many bass were being taken in San Antonio Slough in Marin County at this time on bait, but I made only a few trips up there, with poor results, although I have seen men returning from San Antonio with all the bass they could carry.

Five years ago it was found that the small crabs of the species *Cancer magister* were fine bait. The water in Carquinez Straits and Petaluma Slough and at Benicia and South Vallejo was alive with them. Where they were present, a clam used as bait would not last a half minute. A man who had used crabs for bait in the East showed us how to prepare them. Break off all the legs, cut the edge of the shell all around and lift off the back, then break off the two lower parts of the shell and you have one of the best striped bass baits. A large hook, seven or eight 0, is used and the bait is put on whole. When bass are taking crabs well they seemingly taste the bait first, then grab it and run.

A 35-pound striped bass that it was my good fortune to catch in Petaluma Slough had in its stomach a crab about five inches across the back. At another time a 12-pound bass was found to have devoured thirteen small mud crabs, called "fiddlers."

An arrest was made for having small *Cancer magister* crabs in possession, which put a stop to their use for bait. They are a real nuisance when fishing with other bait and the few that would be used would be nothing to the numbers that die each year when the freshets come down the sloughs adjoining Petaluma Slough.

A large crab of lawful size can be used, but it must be fresh and uncooked. A dozen good baits can be made of it.

The salt water bullhead is the predominating bait at the present time. The head and tail are cut off and the hook, a number four or five 0, is put into the throat from the inside.

Some men strike with the line when the fish grabs the bait, while others have the clicks on the reel fixed very light so it runs easily and the fish is allowed to run with the bait from 20 to 100 feet or until it is thought he has swallowed the bait. The fish is then hooked in the stomach or throat. A fish so hooked does not put up as good a struggle, in most cases, as one hooked in the mouth.

Monterey sardines are used a good deal for bait, also herring. They are cut into chunks or split lengthwise. Fishing with herring one night in January, 1913, in Petaluma Slough, I landed 125 pounds of bass in three hours, the largest fish weighing thirty-six pounds.

During the summer months the fishing in San Pablo Bay, Napa River, Petaluma Slough and their adjoining sloughs is mostly carried on by trolling with spoons, and during that time the fish are usually small, although an occasional large one is caught. It is in winter the bass run large and they are then caught on bait.

The largest bass caught with rod and reel was caught by William West of Napa, in the Napa marshes, on a spoon September 26, 1911. Its length was 51 inches, girth 31 inches, weight 62½ pounds.

Seemingly, there are millions of striped bass in San Francisco, San Pablo and Suisun bays and the rivers and sloughs flowing into them, and with the protection that the Fish and Game Commission is giving them there is no danger of their being depleted

THE EFFECT OF POWER DEVELOPMENT ON FISHING CONDITIONS IN THE HIGH SIERRAS.

By A. D. Ferguson, Field Agent, California Fish and Game Commission.

The construction of great dams across natural streams for the purpose of diverting or storing its waters, gives rise to difficult and trying problems in the way of providing for the free movement of ascending migratory fish over or around such artificial obstructions. To devise a fishway which will enable fish to surmount a dam a hundred or more feet high is no mean engineering feat. Such problems the Fish and Game Commission must solve. It can, and does, happen, frequently, that the construction of a great impounding dam works a very decided improvement in fishing conditions. The major streams of the high Sierra Nevada mountains of central California occupy deep canyons and their tributary waters tumble more or less directly over canyon walls. The minor or tributary streams of the high Sierra region were, because of impassable falls in their lower courses, naturally devoid of fish life. Most of the feeder waters of the river systems of the vast Sierra watershed have been stocked with trout through the agency of man's enterprise, but while there are fish in the main streams and tributaries, the chief movement of fish life as between main streams and feeders is downward and not upward.

The impounding dams now in the Sierra Nevada mountains have been constructed either in connection with hydroelectric power development or as an aid to economical lumbering and are located on tributary streams high above the main rivers. In the first instance the site was chosen for the double purpose of securing a large area for the impounded flood waters and of securing a great perpendicular fall for the piped water in a short lateral distance. In the second instance, the lumberman makes his reservoir nearest his standing timber. And thus it comes about that some people seeing a high dam across a stream where fish are found above and below such dam wonder (and sometimes complain) that the Fish and Game Commission has not compelled the construction of a fishway to enable ascending migratory fish to pass over the obstruction. The unusual conditions existing in such cases minimize the necessity of aiding the fish to ascend the stream. Furthermore, the artificial lake above the dam has made room for thousands of fish where dozens could have existed before the construction

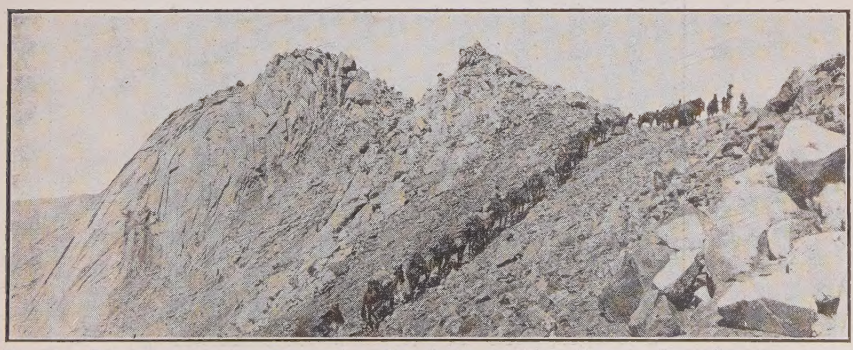

Fig. 19. Transportation by means of pack-train in the high Sierras. By using this means of transportation it is possible to plant many streams otherwise inaccessible. Photograph by A. D. Ferguson.

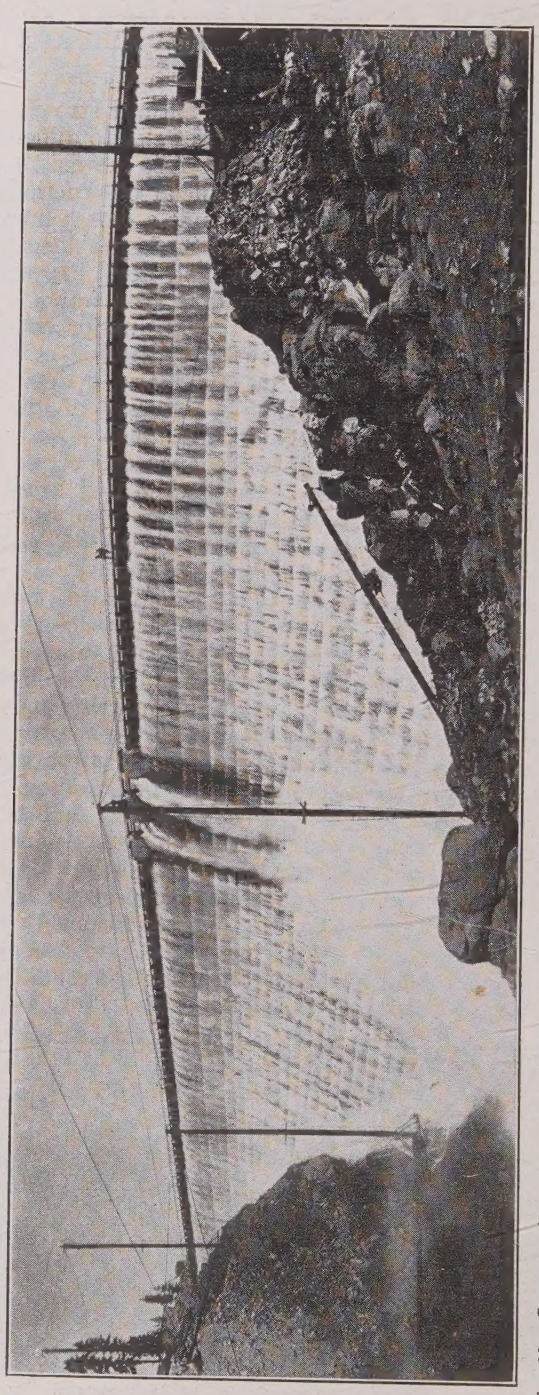

Fig. 20. Concrete dam across Big Creek Gorge in Fresno County. The water impounded forms Huntington Lake. Photograph by A. D. Ferguson.

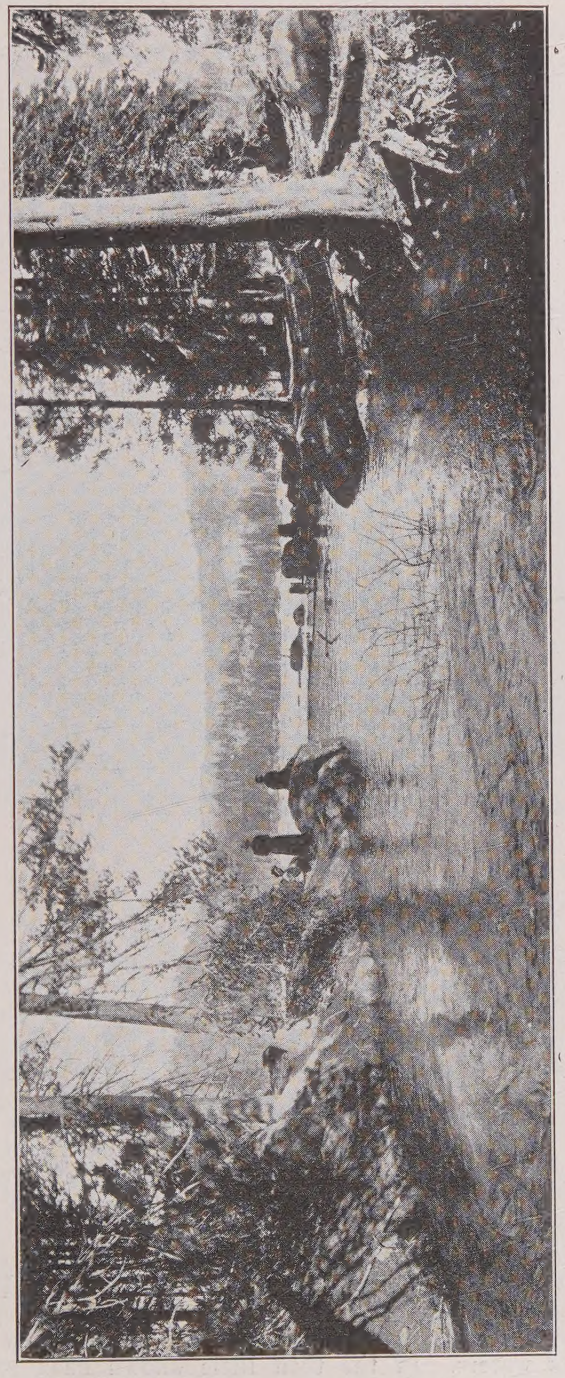

Fig. 21. A fishing scene in the Sierras. Photograph by A. D. Ferguson.

of the dam. Typical instances of how commercial enterprises have benefited a natural resource and given pleasure and profit to thousands of people, in a way their projectors never dreamed of, are to be found in eastern Madera and Fresno counties.

Before the San Joaquin Light and Power Company, taking advantage of a natural site, impounded the flood waters of the Crane Valley watershed, North Fork Creek in Madera County supported but a few trout and apparently had no future as a popular trout stream. The building of Crane Valley Dam made Bass Lake. This beautiful sheet of water, some six miles long, a half-mile wide and a hundred feet deep, is now teeming with both trout and black bass. A popular

Fig. 22. Bass Lake (Crane Valley Reservoir) in eastern Madera County. Power development was responsible for the formation of this fine body of water. Photograph by A. D. Ferguson.

summer resort is upon its banks and hundreds of campers annually visit its shores.

Stevenson Creek in Fresno County, stocked in 1888 with black-spotted trout, would never have furnished an incentive to visits by anglers, had it not been for the construction of the "Shaver" Dam by the Fresno Flume and Lumber Company. In an old-time biennial report of the (then) Fish Commission, it was stated that a careful survey showed that Stevenson Creek could never become a trout stream of consequence. Now, and for many years past, Shaver Lake, formed by the construction of a dam just above the point where Stevenson Creek starts tumbling 4,000 feet in four miles down into the San Joaquin River, is the mecca of thousands of people from the San Joaquin Valley, who, in summer, camp upon its shores and enjoy the good fishing to be had there.

The latest instance of how a high and impassable dam can sometimes prove of great benefit to the people's fishing interests is at Huntington Lake in Fresno County. Big Creek, stocked with rainbow trout in 1897, soon became a good fishing stream to the few people who in that day found its waters. In the then little known back country, its

isolation was its protection. In the year 1911, came the Pacific Light and Power Corporation, with thousands of workmen, to invade the solitudes of Big Creek Basin. At the lower end of the basin, at the head of the gorge through which Big Creek falls some 2,000 feet in a trifle over a mile, the company built a huge concrete dam. At first but 120 feet high, the dam is now being raised to a height of 150 feet. It impounds 150,000 acre-feet of water, and to the stock of rainbow trout already in the creek, the Fish and Game Commission has added several hundred thousand Loch Leven, eastern brook and rainbow fry. A mountain railway and a county wagon road permit an annual influx of several thousand people from all over the state to the shores of beautiful Huntington Lake. A fine hotel and many lesser ones are already located there. The Forest Service and the county of Fresno will jointly build a scenic road along the north shore of the lake during

Fig. 23. Huntington Lake, Fresno County, elevation 7,000 feet. Photograph by A. D. Ferguson.

the coming summer, and the playgrounds commission of the city of Fresno has selected a site on the lake shore where it is planned to give annual outings to 5,000 children.

Here, as elsewhere, the fishing is the chief lure which draws so many people to the mountains, but there is little danger of the fish supply becoming depleted; for not only will the lake support and harbor vast numbers of trout, but each spring, from out its depths, will emerge big, strong, spawning fish to ascend every tributary stream and the process of natural reproduction will go on to replenish the annual drain.

Other notable examples of the incidental (or accidental) benefits which may follow the building of high impounding dams across mountain streams, are the Highland reservoir in Calaveras County, the dam at Strawberry and the big dam at Relief, both of the latter being in Tuolumne County.

MY FIRST TRIP INTO BIG BEAR VALLEY IN THE SPRING OF 1916.

By W. C. Malone, Deputy Fish and Game Commissioner.

On the 18th day of April I received instructions from the Division Office at Los Angeles to take two men and go to Big Bear Valley to rescue the fish that were going from the lake into the mountain streams to spawn, it being stated to me that large numbers of fish in passing up the streams were becoming stranded and that they no doubt would perish unless some provision was made for getting them into deeper water.

Realizing that it was a job that would call for men who were used to roughing it and who were not afraid of cold water or hard work, two men bearing the names of Dotts and Welch were secured. We got into the valley on the 20th of April, 1916, and found that the streams running into the lake were alive with trout that weighed from two to ten pounds.

The storms of the winter had filled the mouths of the streams running into the lake with sand and debris, and the large fish, in attempting to get up the streams, would get stranded in the shallow waters at the mouths, and being unable to get either up or down the streams, became easy prey to both man and beast.

We worked for the first fifteen days rescuing these fish off the sandbars and placing them back in the lake. During this time we were assisted by Mr. Phillips and Mr. Morrison of the fish hatchery at Big Bear Lake, and a Dr. Getchell, who was stopping in the valley at the time. I believe that our work saved for the people of the state of California thousands of fish that would have otherwise died, been destroyed by animals or clubbed and speared by violators.

Probably the experience at the lake this spring has been the common experience around the lake, for I have been told by old-timers of Bear Valley that they used to haul fish out by the wagonload in the spring season, and anyone who knows anything about fish when they are spawning knows that they fall an easy prey to the man who wants to pick them up, as they are at that time very tame and can be easily handled, particularly while they are stranded in the shallow waters.

During the excessive floods of 1916 the lake filled up until the water ran over the top of the dam several feet, carrying immense numbers of large trout out of the lake and into Bear Creek. After the storm was over we estimated that there were between three and five thousand fish in the creek which had been washed over the dam during this storm, each weighing between two and ten pounds. Later, when the season opened, the anglers had great sport trying to catch the large trout in Bear Creek. They used their light tackle which they had been in the habit of using for brook trout, but made very little progress in catching these big lake trout in the stream, and as one fisherman expressed himself: "When you hooked a fish he would shake his head, and if he didn't break a hook, line or leader, he would brace himself against a rock, give a lunge, and away he would go!"

We had a very successful opening of the fishing season in Bear Lake this year. A great many fish were caught and some very nice ones.

The only thing to mar the success of the opening was the roughness of the waters of the lake, which made it very dangerous for fishermen to go on the lake in small open boats. I did all that I could do to keep the fishermen from the more dangerous portions of the lake during that day, and persons who went on the lake in the open boats had to make shore the best way they could. A great many people do not realize their danger in going on these mountain lakes in open boats in the early part of the season. As the weather is more or less rough and the waters are extremely cold, after a person is once thrown in the water he has very little chance of getting out alive, as the experience of four men who drowned in Little Bear Lake on the opening day of the fish season in 1916 proves.

WHAT WE CAN DO TO PROMOTE FISH CONSERVATION.*

By Charles Minor Blackford, M. D.

Perhaps no country in the world possesses more societies and associations for the promotion of various ends than does the United States, and yet the small success that attends the labors of these organizations must attract the notice of anyone who looks into the matter. In every state, in many counties and in every city or large town, we find medical societies and other scientific or semiscientific bodies that are trying to teach the people at large how to better their physical condition, and yet in many cases, their influence is negligible. It was only after the brilliant object lessons given by the altered hygienic conditions in Havana and on the Canal Zone, that the mass of our intelligent people became convinced that the mosquito is anything more than a trivial nuisance and that the housefly is a menace to life, although the medical societies had been preaching these facts to unheeding ears for several years. When the truth was brought home to the people, however, they grasped the situation, and the tables of mortality already show the results of the campaign now being waged against these domestic enemies.

The reason why these bodies of learned and experienced men have so small an influence on the people around them may be summed up in the single word, ignorance. This popular ignorance and its twin offspring, prejudice and vanity, must be overcome before any marked results can be effected. Mere legislation will not accomplish much. Along our special line, the conservation of fishes, there is ample legislation—indeed in some instances there is too much—but the legislation is not accomplishing its end and we should try to find out why it is not doing so. Many of the laws on the statute books are not wise and would not accomplish anything if they were enforced, but the principal reason is lack of enforcement, and it is here that ignorance and its offspring, prejudice, come into play. One of the wisest of the writers on law has said that "He who knoweth the law and knoweth not the reason of the law, knoweth not the law; for the reason of the

*An address delivered before the American Fisheries Society, 1915. Reprinted from the Transactions American Fisheries Society, December, 1915, pp. 13–18.

law is the life of the law," and we must teach the mass of the laity the reason of the law if we wish to put life into the law and get hearty cooperation in its enforcement.

The greatest obstacle that we encounter in doing this is the vanity of the American people. For more than a century it has been a mark of so-called patriotism to claim that the resources of our country are inexhaustible, and anyone who called attention to the danger of extravagant wastefulness, was considered an hysterical alarmist or almost a traitor. In consequence of this foolish talk, we are now seeing the end of our forests, and geologists are estimating, with alarming accuracy, the length of time that will elapse before our stores of iron and coal will be exhausted. National and state governments are frantically taking steps to check the ruthless destruction of these reserves of natural wealth before it is too late, but their efforts will bear scanty fruit unless the people be shown that the wonderful wealth of our country is not limitless. When this is grasped, and not until then, conservation will become an accomplished fact.

When America was first being settled by Europeans, the abundance and variety of the fisheries of both the salt and fresh waters made a deep impression on the colonists. The Grand Banks fisheries played no small part in causing the adjacent continental shores to be colonized, and the fishes along the coasts and in the rivers supplied the colonists with a large part of their food during the earlier years of the settlements. The widespread belief that this resource was inexhaustible led to such reckless destruction that the fisheries began to decline, and about the time of the Civil War the shad catch had diminished to such an extent that its restoration was one of the main reasons for the establishment of the United States Commission of Fish and Fisheries, the predecessor of the present Bureau of Fisheries. Following the example of the national government, many of the states have established commissions charged with the duty of restoring or increasing their respective fisheries, and it is a part of the duty of our society to aid these commissions in the accomplishment of their task.

This can best be done by arousing the interest of the people in the work, and as said above, this can only be done by spreading abroad knowledge of the economic value of the fisheries and showing that in preserving them, something more is intended than merely restricting the rights of the fishermen. Our society can do good work in this direction, both as individuals and as an organization, and I want to make a few suggestions as to how we may go about it.

At the meeting of the Fourth International Fishery Congress, held in Washington in 1908, O. M. Dennis, former state game warden of Maryland, gave some reasons for the failure of fish protective legislation, and among them he placed the selfish jealousy of sportsmen and commercial fishermen in regard to bills introduced by either class. He said that this being true, "The country members of the legislature, as well as the fishermen themselves, look with suspicion on any measure presented to the legislature which has for its purpose the protection of fish and game when such measure is presented by city men." Unfortunately this is true, and it is not confined to Maryland by any means. The antagonism between country men and city men is so

widespread as to be almost universal, and among the rural population there is a general opinion that game protective laws are designed to furnish sport for city men at the expense of the rights of the country people. For this reason the game laws are very commonly looked on as something very much like acts of tyranny, and disobedience of them is regarded somewhat in the light of heroism. It should be remembered that laws are but the crystallized expression of public opinion, and if there be no public opinion favoring a law, or if public opinion be opposed to a law, merely placing a legislative act on the statute book will not produce any result. It is therefore necessary to create an enlightened public opinion in favor of laws for the conservation of fishes, and when this is done the enforcement of the laws will be both easy and effective.

Our society can aid in the development of this public opinion both as a collection of well informed individuals interested in this movement and as an organization. Our members come from many of the states of the Union, and among them are state and national officials, college professors, commercial fishermen, scientists and sportsmen; in brief, every aspect of the fishery question is represented among us. We are not sectional and we have no selfish nor class interests to serve, and consequently we are in better position to spread the knowledge of fish life among the people than would be any trade organization or even a purely scientific society. As individuals it would be well for us to write papers for the press; not merely for the big city papers, the sporting magazines and the fish trade journals, but for the country weeklies that go out among the masses of the rural population. If we were to write articles that are scientifically accurate; that are interestingly put, and above all, are not "in a tongue not understanded of the people," many of our members would be surprised to see how eagerly they will be read and what an effect they will produce. One of the main reasons that societies such as ours have so little effect on public opinion is that the subjects that we discuss and the language in which we discuss them are uninteresting and unintelligible to most of the people outside of our own narrow circle. It is hard for us, who have given much of our time and effort to the acquirement of a special line of knowledge, to appreciate that what is merely elementary to us is an unknown and fascinating world to many intelligent men outside of the ranks of professional naturalists. How many of these people could tell how a fish egg is impregnated and how it develops? How many can tell anything of the life history of even the commonest fishes? The knowledge—if indeed it can be called knowledge—that most persons have of such subjects is a mass of traditional lore, resting on misinformation as a basis, that is so far from the truth that to call a tale a "fish story" is equivalent to saying that it is false. By putting the known facts of fish life clearly and accurately before the intelligent people of our country, we would make hundreds of practical students of the natural history of fishes where none are today, and nearly every one of them would become an active aid in the conservation movement.

Another method of advancing our purpose is to have our members give talks before school children. Many, if not all, of the school superintendents will welcome the chance of having some well-informed man or woman give one or more talks—we need not dignify them by calling them lectures—before the children on this subject, and by so doing the interest of the coming generation will be aroused. The recent Boy Scout movement offers another opportunity. Teach these boys how the black bass or the brook trout spawn; if possible show them some of the eggs during their development, and the boys will become ardent protectors of the spawning fish and not destroyers of them. They will see that the despised city sportsman is a pretty decent kind of fellow after all, and they will teach their parents and their neighbors the value of fish conservation.

Finally, what can we do as a society to arouse greater interest in our avowed objects? We can take a hint from one of our sister societies, the National Geographic Society. We should remember that there is nothing in which any intelligent man is interested that may not be made an object of interest to any other intelligent man if it be properly put. We are far too prone to discuss technical matters that are of great interest to us as biologists and fish culturists, and to forget that these topics, although of great value, are of no interest to the masses unless we try to make them such. At first glance it would seem that there are few subjects less interesting than the cold, bare facts of geography, but by putting these facts attractively, the National Geographic Society has built up one of the most entertaining magazines in the country, and has enrolled a membership of thousands. We might do something of the same sort. We might try to issue a magazine of popular ichthyology that would cover the scientific, the commercial and the sporting sides of our subject, and by having the articles written simply, clearly and accurately, spread the influence of our society throughout the land. We would replace the ignorance and misinformation that now prevail by clear, concise and accurate knowledge, before which the obstinacies and prejudices that now oppose us would disappear. We would enlist thousands of eager students of all ages and sexes to battle for fish conservation, and we would make our society a power in the land. Many of our members are easy and graceful writers, and I feel certain that enough of them would be willing to contribute articles to such a journal that would make it authoritative and valuable as well as interesting and entertaining, and, should the experiment succeed, we would have the consciousness of having performed a valuable service to our country.

TRINITY NATIONAL FOREST GAME REFUGE.

By E. V. Jotter, Chief Forest Deputy.

The Trinity National Forest Game Refuge (Fish and Game District No. 26) situated to the east and south of Big Bar, Trinity County, includes approximately 65,000 acres, of which 2,377 acres are alienated land.

The area extends from the head of a little gulch on the north, at an elevation of approximately 3,500 feet across the Trinity River (elevation 1,300 feet) over Hayfork Bally Mountain (elevation 6,000 feet),

Fig. 24. Lookout on Hayfork Bally, highest point on the Trinity National Forest Game Refuge (District 26). From this section can be heard practically all gunshots within the refuge.

across Hayfork Creek (elevation 2,000 feet). This range in elevation and the south exposures afford both summer and winter range, so that game need not leave the refuge at any time. The area also includes a number of licks much frequented by deer.

An almost equal distribution of timber and brush types is to be found, the latter usually being found on the steep south or west exposures. The timber includes both fir and pine types, the latter having

the most browse and grass feed. Brushfields are largely of manzanita, white thorn, and mountain mahogany, although such browse feed as oak and blue brush is also common.

At present 365 cattle and 14 horses are grazed here by 17 permittees. Very few campers use this region solely for the camping, but in the past it was a favorite hunting ground. After the completion of the down-the-river road, there will undoubtedly be much travel through this refuge, and quite probably more camping along the road.

Deer are found throughout this area, quite generally distributed throughout the summer and fall, and living at the lower elevations during the winter and spring. It is also thought that some of the deer that winter here regularly travel out of this region during the summer and early fall. It is estimated that the average number of deer found here during the summer does not exceed 1,500 head.

Mountain lions move about a great deal, but there are very few within this area and possibly 40 to 50 bears and 150 coyotes make this region their home. Mountain and valley quail and grouse are scarce but squirrels are abundant.

As already stated, this region affords excellent summer and winter feed and because of this reason, as well as the favorable climate and low snowfall along the river, forms splendid breeding grounds. Water is abundant, salt licks are convenient, and there is plenty of early feed.

This region has always been recognized as a good hunting ground and it was so extensively visited in the past that the number of deer was being seriously reduced up to several years ago. Since game laws are being observed more generally deer are increasing. Although no unusual number of game violations have occurred in this region there have been several violations for such reasons as killing doe, more than two a year, or hunting without a license. Local hunters can still use this region with very little risk of detection, but it is not so easy for outside hunters to go alone or in a party without being apprehended. The establishment of this refuge created a safe place for breeding deer to supply a great area of surrounding country. There should be but little reason for any persons except stockmen to roam about within the refuge, and consequently there should be less danger of fire through carelessness by individuals.

The employment of a man to devote his entire time to this area would permit the close supervision necessary to keep out all but those having a legitimate reason to be in the area. Naturally there should be a good check on those who go into the refuge, so that only responsible parties who will be careful with fire, can enter.

At present the only supervision exercised is that done in a general way by Deputy Laws and whatever incidental patrol and supervision can be given him by forest officers. This refuge is fortunately located in that the district rangers at Hyampom, Hayfork and Big Bar are near the main trails of the refuge and the lookout on Hayfork Bally can hear any shots within a part of the area. However, these men exercise only incidental supervision and only two of the number are on duty all year. It would seem advisable, therefore, for an experienced man to be stationed on the refuge all year at a salary of

$100 per month (the man furnishing his own subsistence and horse feed).

The extermination of predatory animals should fall largely to the patrolman who could kill such animals as coyotes during the summer and trap or poison them during the winter. Probably $25 a year would cover the cost of traps, ammunition, poison, bait, etc., used in this

Fig. 25. Cañon Creek Falls, Trinity County, typical of Trinity County mountain scenery.

work. A patrolman can do more to increase the deer by destroying predatory animals, especially coyotes, than in any other activity, not excepting unlawful killing of deer.

Winter feeding is sometimes necessary and would cost from $25 to $50, as we can assume that under this protection the game would increase and require more feed during periods of stress. The proper

protection of the existent species of game and bird life will be all that is necessary to fully restock this area.

Sentiment of the local public is not favorable toward this idea of a game refuge, as it is believed by most of the people that there really is not need for closing any area to legitimate hunting. They believe that all that is necessary is to exterminate the predatory animals, to enforce the game laws in general and particularly to curtail the killing of more deer than is permitted by hunters who travel by auto from county to county, killing their full quota in each.

THE CASE OF THE SPORTSMAN vs. THE CASE OF THE FARMER.

[The following contrasted opinions regarding the relation of the farmer to game are of peculiar interest. Both quotations are from Eastern men. Fortunately, California is practically free from this conflict of interests which complicates the cause of game conservation in Eastern states. Those who never carry a gun have here actively espoused the cause of game protection and are taking part in bringing about the proper kind of laws. And the sportsman is sacrificing his own immediate good for the perpetuation of the game supply. The farmer is as a rule cooperating in preserving wild life, even to the extent of artificially feeding it. Only occasionally is one found who takes the same point of view as Mr. West. The cause of game conservation demands a harmonizing of all purely individual points of view and a wider outlook which shall encompass the benefit of all—not of any single class. The sportsman and the farmer must ultimately meet on common ground and work together for a common end—a policy of conservation which shall ensure the greatest good to the greatest number.—EDITOR.]

Dr. Joseph Kalbfus, Executive Officer of the Pennsylvania Fish and Game Commission (Bull. No. 2, Pennsylvania Fish and Game Comm.), defends sportsmen thus:

"The necessity for additional protection to our wild beneficial birds is beyond question, yet, strange to say, those from whom, because of their professions, we expect the most (churchmen) and those who derive the most from the life work of birds (farmers) have up to this time done comparatively nothing for the birds.

"Fortunately for the birds, as well as for the state, there are certain people taking an interest in this matter, and strange to say, those who have up to this time done most for the birds are those who in the public mind are supposed to be bird destroyers, and known as sportsmen. In the face of this opinion, I assert without the fear of successful contradiction, that every law upon our books today giving protection to wild birds, either game or otherwise, was put there at the instance, or through the influence of sportsmen. They are the men who have said through legislative enactment that certain birds known as song and insectivorous birds, because of the value of their life work, shall not be killed at any time, and that birds known as game birds shall be killed only during certain periods and in restricted numbers, and they are the only men who have insisted upon and assisted in the enforcement of the statutory provisions relative to these subjects. They are the men who today are supplying through the Resident Hunters' License Act the sinews of war through which protection is given not only to game birds and animals but also to song and insectivorous birds, and without the help of which the labor of the farmer would, in the majority of instances, be profitless. In addition to this, they (the sportsmen) are providing the fund through which the farmer is paid a bounty for killing a weasel or other vermin that may be found destroying his poultry. They are the men who today are providing the cash to pay for grain used in feeding game and other birds during severe winter weather; in many instances they are paying for the labor necessary to place this grain where the birds may get it. Some few farmers are feeding birds during the winter time, or are at least permitting the birds, such as quail, that happen to come into their barnyard, to partake of the grain scattered for their poultry, but the great majority of farmers are not feeding or caring for the birds in any way. I have been collecting statistics regarding this matter for years, and know

whereof I speak. I have found but few farmers, who, unless they were also 'sportsmen,' when the deep snows of winter have come, will take a bag of grain on their backs and hunt up the starving quail to feed them, but upon the contrary, many farmers, in action at least, say to the quail, 'I know you are hungry and I have the grain to feed you, but if I give you that grain, worth a dollar a bushel to me, you will in all probability go over onto my neighbor's property, and he will either kill you or get the benefit of your life work, so I guess I'll stay in by the fire at home and keep my grain.' Along comes the sportsman, very likely traveling in a hired rig, who buys this very bushel of grain, feeds part of it to the birds the producer of the grain has refused or neglected to feed; part of it he feeds to birds on the neighboring farm. He keeps the birds alive, for not one would have survived the winter without his care; yet when he comes in the fall with gun and dog to take a part of what he has saved, he finds a trespass notice on almost every tree and post. The farmer who has done nothing to save the birds, in great big letters, says 'KEEP OFF,' and I wonder who will care for these birds next year."

Alfred C. West, writing in *Recreation* for September, 1915, defends the farmer's point of view thus:

"The farmer is also interested in game protection. He sees the young pheasants in his meadows. When he is near he makes a little side trip to see how they are getting along. In the old brush lot he sees an occasional rabbit scurrying down the bushy path. In the woods he watches the gray squirrels in play and their bickerings and thinks what a shame it is to kill them. He hears the quail whistling and the partridge drumming or sees the young ducks swimming around the bend of the creek and it seems good to be alive. A little later the hunting season opens but the farmer's work is pressing so that he can not get out in the woods that day. He hears the steady cannonading in woods, meadow, swamp and brush lot. He sees the automobiles rush past his place or stop in his yard, with or without a request that he care for them 'for a little while.' Perhaps a neighbor telephones in that his stock are out in the road where some party of 'sportsmen' has left a gate open or perhaps even cut his fence. It may be that a favorite cow comes to milking time, blind in one eye or bleeding all along the sides from the charge of shot of a man who may have been nervous or only drunk. A few days later he may get a few hours when he can go hunting, but everything is changed. The young pheasants are all killed. The squirrels can not be seen. Indeed, with all his exact knowledge of the habits of the game on his land he is indeed fortunate if he can get one or two shots. If he tries to protect himself under the trespass laws, he finds that the courts will not uphold him. * * *

"All this brings us to a realization that the game is decreasing largely because the farmer feels that it is not to his interest to have it do otherwise. It has already been shown how the mere presence of game is often the cause of a money loss to the farmer. * * *

"How may the game be increased? It will be evident to any one that the game of the country can not be protected if the farmers are not willing to give active assistance in enforcing the game laws and few farmers will give any active aid while they are made to feel that a reduction in the number of game animals on their lands is a distinct advantage. * * * If the farmers could have the benefit of a good trespass law and could be allowed to get profit in some way, if only by the sale of hunting permits, from the presence of game on their lands the disappearance of the game could be stopped. The present game laws seem to the farmers to have been made by and in the interest of men who want to get something for nothing and let the farmer pay for it, and until this condition is remedied laws may be piled on laws *but the game will keep on its present road to oblivion.*"

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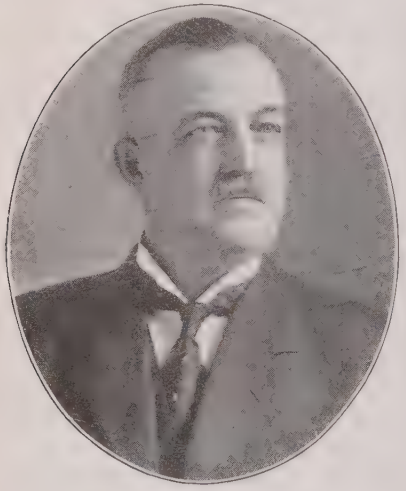

THE NEW COMMISSIONER.

On December 8, 1916, Mr. Edward L. Bosqui of San Francisco was appointed fish and game commissioner to succeed Carl Westerfeld, who was elected at that time to the office of executive officer of the commission. Mr. Bosqui is a son of Edward Bosqui, a pioneer printer and publisher of San Francisco. The present commissioner, like his father, is a lover of field sports and has found recreation in fishing and hunting since his boyhood days. This long experience with the fish and game of California makes of Mr. Bosqui a most valuable ally of the men who hunt and fish and of those interested in wild life conservation. Acquainted with the out-of-doors as few men are, he brings to his new position a knowledge of conditions that is sure to count for better fish and game conservation. His slogan is: "More fish and game for all of the people."

NEW GAME LEGISLATION.

As in past years there has been much interest taken in the fish and game legislation before the present legislature. In all 60 senate bills and 106 assembly bills relative to fish and game were introduced during the month of January. Some of these bills are constructive conservation bills; others would tear down much of the protective work of past years.

Noticeable among destructive bills are those relating to the taking of protection from such nongame birds as the red-shafted flicker or "yellowhammer," the meadowlark and the blackbird, and the taking of protection from ducks and geese in certain areas where it is claimed they are causing damage to rice. Provisos in our laws already stipulate that crops may be protected from the depredations of nongame birds. At least four bills provide for extensive bounties on predatory birds and animals. One bill sets aside $80,000 for bounties, and still another, one-fourth of all hunting license fees. Any such step would be a backward step, judging from the experience of other states. The bounty system has nowhere been a success except in those rare instances where a single animal of uncommon occurrence is the one on which a bounty is paid. In almost every case where the bounty system has been tried it has resulted in fraud and misrepresentation and in an early depletion of the public treasury.

A number of bills of constructive character have been introduced by the Fish and Game Commission. Many of them are amendments to existing laws and are designed to make enforcement easier. For instance, the laws protecting beaver and sea otter have been amended to include green skins as well as the possession of the animals themselves. During the past two or three years two attempts at conviction have failed owing to the inadequacy of these two laws. Amendments have also been made to the Bowman law, so that game breeding can be

encouraged rather than discouraged. Regulations for the shipment of game so as to avoid the smuggling of game to the market by means of parcel post is another important amendment.

New laws of interest are:

The trappers' license law, designed to give a record of the fur-bearing mammals taken in the state; the taxidermist's license law, providing for the supervision of those who mount trophies of the hunt; a law prohibiting shooting from an automobile; an act providing for the revocation of licenses of convicted violators; and one providing for a closed season on the black bear.

Fig. 26. Fishing on the north fork of the Feather River. Photograph by F. A. Farnum.

A still more important bill is one that provides for the establishment of seventeen new game refuges to be located in national forests. With the refuges already established these new ones will complete a chain extending from the Mexican line to the Oregon line.

TWO FUNCTIONS MUST BE PERFORMED BY FISH AND GAME COMMISSION.

A study of the various state commissions and their service to the state shows that each commission has two prime functions : (1) law enforcement; (2) education and publicity. For example: The State Horticultural Commission is primarily engaged in the enforcement of the quarantine laws. In addition, it is important that this commission educate ranchers to recognize injurious insects and to furnish information as to the latest and most efficient means of protecting crops from the ravages of insects and disease. The State Board of Health is responsible for the enforcement of certain quarantine laws and other laws involving the public health. On the other hand, this same board continually carries on educational and publicity work to help the people to recognize and combat infectious disease.

In a like manner, the State Fish and Game Commission is under obligation to carry on, in addition to work in law enforcement, educational and publicity work necessary to acquaint people with the fish and game laws, and to make them take sufficient interest in fish and game to properly conserve it.

The second function of a state commission is the more constructive and fundamental. Consequently it is deserving of wider attention than it has yet received.

SEVENTEEN NEW GAME REFUGES FOR CALIFORNIA.

If a measure proposed by the Fish and Game Commission is passed by the pres-

ent legislature, California will lead all the states of the Union in the number and acreage of its game refuges. It is becoming more and more apparent that one of the best means of conserving game is to establish game sanctuaries, where predatory animals are destroyed and other wild life is allowed to breed unmolested. Game increases rapidly in such sanctuaries and the increase spreads out to neighboring territory, where it furnishes food and sport to all who seek it.

With the cooperation of the United States Forest Service, seventeen areas in the Sierras and Coast Range have been selected and recommended as refuges. With the new refuges and those which have already been set aside, in addition to the several national parks, California will have a series of sanctuaries extending from the northern boundary to the Mexican line and covering in all 2,639,250 acres.

The locations of the refuges have been chosen with reference to the various kinds of game to be found, where both summer and winter range is provided and where administration will be easy. Doubtless some hunters will be inconvenienced by the establishment of these refuges in localities where they have been accustomed to hunt, but most of them realize the necessity for such conservation measures and will gladly seek other hunting grounds. The following list gives the location and area of each of the proposed refuges:

PROHIBITION OF THE SALE OF TROUT NECESSARY.

Most of the states have become convinced that commercialization means extermination, and therefore have passed laws prohibiting the sale of all game. California many years ago was driven to prohibit the sale of deer, quail and shore birds. Now necessity demands that the sale of trout be stopped.

The incentive to gain the dollar has forced the market fishermen at Lake Tahoe to deplete the supply of fish in that lake. Nor is that the only lake threatened, for the facility with which markets can be reached by means of automobiles makes the stripping of other mountain lakes more than a possibility. The angling afforded in mountain lakes should act as a lure to take people afield, where healthful recreation is possible. This can only be accomplished when undiminished sport can be obtained.

The market fishermen of Lake Tahoe are making a strong fight to defeat the nonsale of trout bill, which is before the legislature. The bill is a sane conservation measure and will deprive no one of his livelihood. These fishermen can earn a better day's wage by taking out anglers than by the sale of ten pounds of trout, a day's limit.

The sale of trout allows the millionaire to obtain these fish for his table, but the poor man can not afford such a luxury. Stop the sale and the trout of Tahoe and other mountain lakes will be

County	Location	Acres
San Diego	In vicinity of Laguna Mountain	51,840
Riverside	In vicinity of Sheep Mountain	69,120
Ventura	Near headwaters Sespe River	125,440
Santa Barbara	Near Upper Sisquoc River	39,680
Tulare and Kern	Where Kern River crosses county line	37,600
Fresno	Near forks of Kings River	33,400
Amador	In vicinity of Panther Creek	57,600
El Dorado	Near headwaters American River	64,000
Plumas	Near headwaters Feather River	31,000
Tehama	In vicinity of Mill Creek	34,400
Lassen	On northwest side Eagle Lake	47,580
Modoc	In vicinity of Pine Creek	47,560
Modoc	In vicinity of Mowitz Butte	57,000
Shasta	Near north side of county east of McCloud River	69,000
Siskiyou	On north side Klamath River	8,960
Mendocino and Lake	Near Hull Mountain	37,000
Monterey	At head of Arroyo Seco	69,000
Total number of acres		880,180

for all alike. Anyone who wishes may enjoy the angling which these lakes afford, and fishing conditions will improve rather than deteriorate, as they have the past few years.

THE SPEARING OF STEELHEAD TROUT.

The most fundamental law of fish and game conservation is the one which provides that fish and game shall be allowed to breed undisturbed. We demand that all of our best game birds and mammals be given the best of protection during the breeding season and the closed season is always made to conform to the breeding season. In spite of this situation there are a number of people in the coast counties who are demanding the right to spear steelhead trout while they are on the spawning grounds. Furthermore, they are demanding the right to fish with a gaff, thus increasing many times the destructive forces already at work. Just as people are seeking a better grade of sportsmanship by advocating the use of a fly rather than bait in capturing fish, just so the tendency should be towards the elimination of such a destructive instrument as a gaff hook. This instrument can be carried to a pool where large spawning fish are abundant and by feeling around with the end of the hook the whole pool can be stripped of its fish. This is seldom possible when a spear is used. The law as it now stands provides that the people of the counties mentioned can capture two fish a day between December 15 and February 15, a sufficient number for use as food. The demand for a more liberal law as regards the method of capture is in reality a demand for a larger catch at the time of year when fish should have total protection. Every spawning fish killed means a direct loss of thousands of young fish. Furthermore, it is always the largest and therefore the heaviest spawners that are taken by means of a spear or gaff.

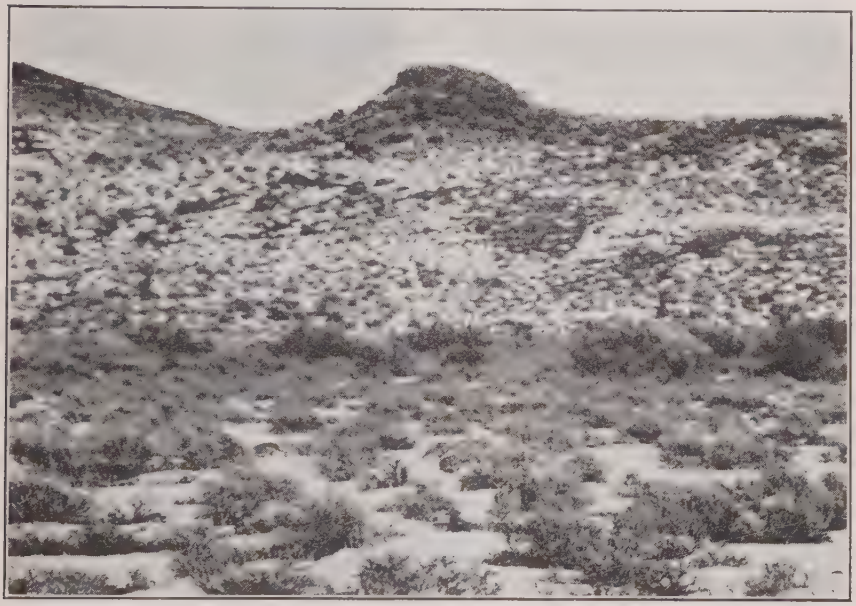

Fig. 27. Wild sage hens feeding near Straw, Modoc County. Photograph by G. Courtright.

As far as possible each section of the country should be allowed to utilize its wild life resources, but destruction of such resources can not be permitted.

It will be necessary, ultimately, to prohibit the destruction of fish during the spawning season. The move to take a larger toll of the spawning steelhead throughout the state is therefore directly contrary to natural law and a depletion of the streams is sure to follow.

Fig. 28. Lake Tahoe, home of the famous Tahoe trout. Photograph by H. A. Parker.

POWER DEVELOPMENT IN THE HIGH SIERRAS BENEFITS FISHING CONDITIONS.

In most instances the works of man have a detrimental effect on wild life. That bettered fishing conditions should go along with hydroelectric power development in the high Sierras appears unusual. Such is the case, however, as can be seen from Mr. Ferguson's article, which appears on page 55 of this number. Moreover, there are other good things which follow such development. Scenic beauties are improved by the addition of large bodies of water, and good roads make out-of-the-way places accessible. As everyone knows, development of this kind means a lessened supply of game birds and animals. It is interesting to note, therefore, that in many cases the opposite is true with fish and that, as a rule, fishing conditions are bettered rather than impaired.

THE TUOLUMNE FISH AND GAME PROTECTIVE ASSOCIATION.

We have often wondered why so few effective game protective associations exist in California. In eastern states practically every man that carries a gun is identified with the local fish and game protective association. Can it be that organizations of this type only spring up when fish and game have been nearly exterminated? Surely there is work for such organizations in states well stocked with fish and game. In fact, the object of such a society should be centered on conserving a permanent supply of fish and game rather than on the bringing back of wasted wild life resources.

We are glad to announce the formation of the Tuolumne Fish and Game Protective Association. The professed objects of this organization are the protection and perpetuation of fish and game. To gain this purpose the members will cooperate with all game wardens by reporting violations and will also willingly appear as witnesses at trials.

In a state such as California there should be hundreds of such organizations instead of less than a dozen. What a potential power lies undeveloped! How much it would mean for fish and game conservation if there were many fish and game protective associations in our state all banded together in one great organization, not with a selfish or local purpose, but with a single interest—fish and game conservation.

HEADLIGHT GLARE CAUSES DEATH OF DEER.

Orders recently were issued by the Southern Pacific to its engineers to save the lives of deer seen on the tracks at night by momentarily putting out the headlights of locomotives.

While deer are migrating from higher to lower altitudes they frequently use the railroad tracks for the journey, and if traveling at night are dazed by the headlights of approaching locomotives. Southern Pacific trains, especially in the Siskiyou mountains and in the Sierras, have struck and killed as many as a dozen deer in a single month. On looking into the glare of the headlights, the animals are confused and unable to get out of the way. On darkening the light, even for an instant, they jump to safety.

On receipt of a statement of conditions from the Fish and Game Commission orders were issued by President William Sproule and General Manager W. R. Scott that headlights are to be momentarily extinguished when deer are seen on the track, except in instances where the train is approaching a public crossing, or in any other instance where the public will be jeopardized.

A CREED OF WILD-LIFE CONSERVATION.

[The following interesting creed, to which we largely subscribe, appeared several years ago in *Outdoor World and Recreation.*]

1. The protection of all useful wild creatures and preservation of nature's resources from wanton destruction that the natural beauties of the great outdoor world may not be rendered wastes and barrens, but be preserved for the use and recreation of us and those who come after us.

2. Such restrictions upon the sale of all game or food birds as may be necessary to preserve a continental supply of such birds and prevent their extermination and secure the most practical results from their economic value.

3. A uniform system of closed season throughout the continent that will prevent the killing of all useful birds from the

first day of February in each year to the first day of September following, and such extension of special closed season as may be necessary to prevent extermination of particular species of birds.

4. Such restrictions upon the use of all sporting arms of whatever type as may be necessary to preserve a normal breeding supply of useful wild creatures.

5. A transcontinental system of game refuges and forest reserves.

6. A wise system of practical laws encouraging the breeding and sale of propagated game and food birds.

THE ENGLISH SPARROW CAMPAIGN IN REDLANDS.

The October number of CALIFORNIA FISH AND GAME made some mention of the English sparrow campaign being conducted by the city of Redlands, and a brief summary of the results of that campaign to date is therefore timely. I am indebted to Mr. I. Cushman Gray of the city clerk's office for most of the data given as evidenced by the city records.

For several years past English sparrows have apparently been gaining ground in Redlands, until last winter and spring they were becoming an alarmingly conspicuous element of what might be termed "the downtown fauna." They have been reported a number of times from the Heights and other outlying parts of the city, but I myself have seen them only in the business district and the thickly settled region immediately environing it. In my yard, a little over two miles from the heart of town, I have never seen an English sparrow during the most constant watch, though a number of the native sparrows are common enough. Downtown it has been otherwise, and an increasing feeling that municipal action was the only way to combat successfully the menace of the increasing numbers of the invading sparrow finally culminated in a resolution of the board of trustees authorizing a war of extermination. This was duly begun on July 19th. The work was placed under the direct supervision of the city marshal, and shooting was the general method employed. Several hunters were engaged in the work at a compensation paid by the city, but dependent upon the number of birds killed. This was at the rate of five cents per head until the "game" proved so scarce or hard to find that it became necessary to raise the bounty to ten cents in order to insure the completion of the work. The higher bounty has been in effect since the 6th of September. Up to the time of writing (the last of November), a total of 4,265 birds have been killed. The catch is apportioned through the respective months as follows:

July 19 to August 30	1,528
September 1 to 30	1,841
October 1 to 31	862
November	34
Total	4,265

The cost to the city is represented by the following figures:

1,729 birds at 5 cents each	$86 45
2,536 birds at 10 cents each	253 60
Total cost to city	$340 05

Judging from the reports which have come in to them, the city officials believe that the campaign has been quite thorough. But few of the sparrows are now seen in the city, and these are said to be mostly on the outskirts, though I am aware of one colony and have been told of another close to town, which are not yet entirely stamped out. Therefore the campaign is held to be practically closed.

Probably the most difficult problem connected with the execution of an anti-sparrow campaign is that of the successful eradication of the European bird without too great damage to our many useful species of native sparrows, the presence of which is so indispensable to the agriculturist, yet which so frequently suffer confusion at the hands of the layman with their undesirable foreign cousins. Concerning the success with which this difficulty was surmounted in the present instance, opinions vary. Without attempting to take a stand either way, it may be that a brief reference to the diverging views may be of value to those who are planning or have in hand a similar campaign elsewhere. The men in charge of the campaign claim that less than 1 per cent of the total birds killed were of species other than the one sought. On the other hand several citizens not connected with the hunt itself, but interested in the preservation of valuable birds equally with the destruc-

tion of noxious ones, maintain that the slaughter was less discriminating and that the English sparrows did well to comprise half of those killed during the war. According to this view, the major percentage were linnets, white-crowned sparrows, and chipping sparrows. The hunters did not encounter much difficulty in identifying the male English sparrows, but the females are much harder to tell at a little distance from other birds. Is it not the general experience that the only safe way to deal with this problem is to place the entire campaign in the hands of one who not only knows the identity and relative value of bird species, but who is thoroughly familiar with their habits and appearance in the field as well? This seems to me a vital point, so important in the broader aspects of the whole problem as to justify any extra trouble or expense which in such a campaign is at all likely to be entailed. It should always be remembered that the principal reason we have to justify the slaughter of the English sparrow is that he is an enemy of our native birds. In attempting the restoration of the faunal equilibrium, we defeat our own chief end if we inadvertently destroy the wheat with the chaff.—STILLMAN I. BERRY.

THE HUNTING ACCIDENTS OF 1916.

Pursuant to the custom, begun last year, of recording hunting accidents, we give herewith a list of such accidents for the year 1916. The compilation has been made in the hope that many observing the results of the careless handling of guns, will use more caution in the future, and so lessen accidents of this sort. It should be noted that in spite of the fact that the list is a long one, many hunting accidents occurring last year have gone unrecorded because of the lack of definite information regarding them. Furthermore, automobile accidents in which hunters were concerned are omitted.

A comparison of the report with the one made last year shows a pleasing decrease in fatal accidents in which a man was taken for game. On the other hand, there is a decided increase in the number of hunters injured or killed through the accidental discharge of a gun. Certainly, the report teaches that:

A gun must never be pulled out of a boat or under a fence barrel first.

Fig. 29. Male and female English sparrow. This introduced bird not only destroys growing crops but drives away native beneficial birds. Control campaigns have been carried on in several cities. Courtesy National Geographic Magazine.

HUNTING ACCIDENTS.

Killed.

Name	Shot by	Date	Locality	How shot
Sydney Harrington	Antone Pelascini	Aug. 5, 1916	Bolinas	While hunting deer.
Thomas B. Patterson	Fred Hoffman*	Sept. 27, 1916	Big Bar, Trinity Co.	Mistaken for deer.
Chas. A. Ludekins	Alex Adams	Feb. —, 1916	Pine Grove	

*Committed suicide afterwards.

Wounded.

	Companion	Sept. 31, 1916	Mt. Meadows, Lassen Co.	While shooting at deer.
Joe Healy (16 years)	Companion	Nov. —, 1916	Sacramento	On hunting expedition.
Fletcher Pattison	Companion	Oct. 18, 1916	San Diego	While trying to shoot ducks.
Julius Pullen (11 years)		Aug. 24, 1916	Eureka	Taken for deer.
Carl Morabe	Ed Shealor	Sept. —, 1916	Silver Lake	
Frank Warnekros	Companion	Sept. —, 1916	Fresno	Shooting doves.
Wm. Fowler	Companion	Dec. 12, 1916	Newman	Hunting quail.
Clarence Viethees (16 yrs.)	George Hogan	July 10, 1916	Petaluma	Hunting. Died.
Robert Davis	Companion	Oct. —, 1916	Yolo County	Hunting quail.
Wm. Hardester (17 years)	Companion	April 24, 1916	Lake County	Mistaken for game.
H. C. Hinckley	Companion	Nov. 19, 1916	Yolo County	Hunting ducks.
Louis Unselt	Two hunters	Aug. 3, 1916	Ukiah	Mistaken for deer.
Justin Bordenave	Harry Nice	Dec. 10, 1916	Oakland	Shooting ducks.
John Crumley	Unknown hunter	Aug. 30, 1916	Sonora	Working in woods.
Carl Armstrong	Willie Collier	Oct. 26, 1916	Oakland	Hunting ducks.

Shot by Accidentally Discharged Gun.

Name	Locality	How shot
Seally	Napa	Crawling through fence. Arm shot off. Died from loss of blood.
Ray Baugh	Monterey	Shot in arm while hunting ducks.
Frank Kelsey	Monterey	Shot in leg while hunting deer.
Thomas Jensen	Salinas	Shot while hunting quail.
Lawrence Beevers	Salinas	Shot in thumb while hunting quail.
William Irvine	Salinas	Shot in head while hunting ducks.
——— Austin	Broderick	Shot in hand while hunting ducks.
Henry Lempuhl	El Cajon	Killed by discharge of gun being taken from auto.
Leslie Smallfield	Angels Camp	Shot in thigh while hunting; died of blood poisoning.
Tony Navas	Murphys	Shot in foot.
Edward Kelly	Marin County	Shot in arm pulling gun through fence.
Harold McKay Noble	Dorris	Killed while creeping up on ducks.
H. C. Hinckley	Knights Landing	Shot in eye.
Albert J. Richards (19 years)	Cazadero	Shot in leg. Died.
Walter B. Lander (23 years)	Guerneville	Shot in head. Died.
Joseph Demenzet (25 years)	Sonoma County	Shot in chest. Died.
Alfred Hillyer (20 years)	Reclamation	Shot in groin. Died.
Russell Martin (16 years)	Skaggs Springs	Shot in foot.
Bernard Schoenings	Petaluma	Shot in legs.
Jack Dron (14 years)	Sacramento	Shot in foot.
Albert Richards (26 years)	Santa Rosa	Shot in leg. Died from loss of blood.
Jules Batka	Chico	Shot in arm on stumbling.
Frank Buchalla	Melones, Tuolumne Co.	Companion tripped and fell, discharging gun.
John Kelly (18 years)	Las Gallinas	Shot in arm while pulling gun from boat.
Chas. A. Sullivan	Cupertino	Shot in arm.
Sherwood Moran	Stockton	Shot in hand.
Clarence Smith (16 years)	Seaside	Shot in hand while hunting ducks.
Ralph Thomson	Salinas	Shot in face while crawling through barbed wire fence.
Leland Paul	Pacific Grove	Shot in hand when attempting to remove mud from gun.
Wm. R. Lansdale	Anderson	Shot in left leg.
Paul J. Maguire	Los Angeles	Fatally shot by accidental discharge of gun in hands of companion.

MAPS FOR YOUR SUMMER VACATION.

The government wisely provides help for those who seek it. The agriculturist is furnished with information as to methods of growing larger and better crops. The mariner is furnished with information as to weather conditions. Even the summer vacationist has at his command information on the locality chosen for a summer camp. The quadrangle maps issued by the United States Geological Survey are almost indispensable to the person who desires information on the contour of the country and the location of points of interest. By the use of these maps the average camper can tell with fair certainty just where he is. These maps are available at cost price and can be obtained either in Washington or in nearly all the large cities. Most of California has been thus mapped, but there are many other states that are not so fortunate. The present movement to expedite the completion of the topographical maps of the United States is therefore commendable. Those sufficiently interested should bring pressure to bear upon the authorities in Washington, D. C., that more of these important maps may be made available to the people.

Attention is called also to the excellent recreation maps furnished by the United States Forest Service. These maps give dependable guidance regarding trails, roads, streams, settlements, etc., of each national forest, together with a description of the resources of the forest.

SALISBURY FISH AND GAME FILMS NOW AVAILABLE.

The Fish and Game Commission is now in possession of a set of the famous Salisbury Fish and Game Pictures. The six thousand feet of film depicts the fish cultural work of the commission, showing the operations from the taking of the eggs to the planting of the young fish in the streams, illustrates the life history of many birds and animals and vividly portrays many of the fundamental aspects of wild life conservation. Schools, sportsmen's clubs and other organizations desiring to have these films shown under their auspices should write the Bureau of Education, Publicity, and Research, Museum of Vertebrate Zoology, Berkeley, California.

NATURE STUDY IN LOS ANGELES PUBLIC SCHOOLS.

Under the direction of Dr. Charles Lincoln Edwards, nature study has become an important part of the curriculum of the Los Angeles public schools. The whole system of nature study is built up on the theory that children should not be told the things which they can find out for themselves and that nature play, rather than nature study, is the key to a wonderful fairyland of which the child is a part. Without formal lessons and examinations and stimulated only by the spirit of play, the child may get an understanding of the other animals that live in the world about him.

According to Dr. Edwards ("Nature Play" in *Popular Science Monthly*, April, 1914) : "Nature play is the true basis for all knowledge. Through this dominant interest the child is led to know of the living things about him. Not merely are the facts of nature important, but much more valuable is the fascinating story of how and why these facts came to be. It is of much import to learn that the animals which bear scales and those covered with feathers, or fur, are all wearing similar clothing, but of the different fashions best suited to their needs. It is still more significant to realize that fundamentally the minds of all animals are as allied as are their digestive and respiratory systems. The great end of nature play for the child is not simply to learn of the rest of nature, but better to know himself as a part of nature."

In the Los Angeles system the field trip is given rightly an important place. Knowledge of the birds and animals about us is acquired best through a first-hand acquaintance rather than through the medium of a picture or a written description. The whole educational system should be more closely associated with natural objects seen out of doors. It is to be hoped that many other cities of the state will inaugurate nature study field trips. When nature study is more widely taught in our public schools the principles of wild life conservation will become so imbedded in future generations that there will be no lack of champions of the conservation cause.

FUR FARMING IN BRITISH COLUMBIA.

That fur farming is becoming a well established industry in British Columbia is evidenced by the following, which appeared in the eleventh report of the provincial game warden, 1915:

The reports received from the fox-farming companies that are operating in this province have been extremely satisfactory, some of the operators having gone to a great deal of trouble in giving a lot of information as to their methods. A most comprehensive report of the operations of the companies at Telegraph Creek was also received from the government agent of that district. Great pains were evidently taken in getting up this report, and it is most valuable, as it gave most detailed information on everything that could possibly be of interest. It is hoped that before long it will be possible to embody this and the other reports into an article that will be of use to those who are either engaged or about to engage in the industry.

Until this year no records were received at this office of any foxes bred in captivity, but this year eleven different farms have sent in such records. In all, fifty-six foxes were bred this year, and, as far as is known, these are all still alive. In addition, one or two litters of red foxes were born, but destroyed as not being worth raising. The company operating at Bella Coola reports that several litters were born, but that heavy blasting on a road close to the farm caused the parent foxes to destroy all their young. The Telegraph Creek companies had no success at all; most pups born were killed by their parents; one litter that might have been raised was destroyed, as they were only of the red variety.

The most successful operators were those located at Atlin, Pouce Coupe, and Francois Lake.

There was a fairly heavy loss of foxes during the year; some escaped from the pens, others got killed in fighting, but the principal loss was through "worms." All such losses can easily be done away with if the foxes are in the hands of a man who has requisite knowledge of his work.

The recent collapse of the boom in fox-farm shares will eventually result in just as much good as the collapse of the real estate boom. The industry will now come down to a proper business footing. Prices of live foxes having fallen, nothing like the capital hitherto required will be necessary, and many people will go into it on a small basis who were not able to do so before, and it is the small operators that are likely to meet with the most success.

Even with the price of fox pelts 50 per cent lower than it is at present, a good profit could be made in breeding foxes, as it costs very little more to raise foxes on a small scale than it does to raise small dogs. There is no reason why all the farmers' sons should not have a pair or two as pets, in the same way that boys in England keep rabbits, pigeons, etc., and often make good profits. It is likely that far more money would be brought into the country in this way than by a few big companies.

Every encouragement should therefore be given to those living in the country to make a start. It would be best to begin with red foxes, which are easily obtained and of little value.

THE CONSERVATION OF NATIVE FAUNA.

The October number of *The Scientific Monthly* contains an interesting article entitled "The conservation of native fauna," by Walter P. Taylor of the Museum of Vertebrate Zoology, University of California.

Dr. Taylor traces the history of the gradual reduction in numbers of all of the larger game mammals of California from the time when, in the early history of this state, they were abundant, down to their present depleted state, which in at least two cases, the grizzly bear and the sea elephant, amounts to total extinction.

The mammals whose histories are given are the otter, the beaver, the sea elephant, the sea otter, the deer, both black-tailed and mule, the Roosevelt and valley elk, the mountain and desert sheep, the prong-horned antelope, the black bear and the six different species of grizzly bear.

Some very interesting data are given regarding the traffic in furs in the early history of California, when large numbers of skins were exported. The increased scarcity of sea otter skins is indicated by the increase of price, which in 1880 was $80 and in 1910 was $1,703.33. Elk and deer were so abundant in early days that three thousand were exported from San Francisco in 1842, at prices ranging from fifty cents to a dollar per head.

The grizzly bear, once so distinctly a part of California as to suggest the name "Bear State," and to become the totem on the first flag of California, has disappeared completely. The last known survivor of the largest species, found in southern California, was killed in the Santa Ana Mountains in August, 1900 or 1901.

The concluding paragraphs of Dr. Taylor's paper point out the fact that not

only California, but the whole world, has been wasteful of its wild life resources for the last fifty years, and that it is vitally important that the people everywhere understand the urgent necessity for conservation measures even more rigid than those already in force, in order that California may regain, in part, what her people have been so prodigally wasting for so many years. On the biologist is laid the role of leadership in the campaign for the preservation of native fauna and on him must blame for ignorant and destructive popular action, legislative or otherwise, inevitably fall.—PHILIP JANNEY.

THE NATURAL ENEMIES OF BIRDS.

In order to exhibit the utility of native natural enemies of birds and to show the misfortunes that might follow their extermination, as well as to set forth the conditions under which they might need restraint, and to point out those exceptions that are believed to be most destructive, a bulletin has been issued by the State Board of Agriculture of Massachusetts. This paper, in the Economic Biology series, bulletin No. 3, is entitled "The natural enemies of birds," and is by Edward Howe Forbush, State Ornithologist. Fifty-eight pages are utilized in treating of the natural enemies of animals, in pointing out the useful and the harmful species and the means to be taken to control those which are harmful. This is followed by more detailed accounts of the introduction of domestic enemies, such as the cat and dog, rat and such feral enemies as foxes, minks, weasels, skunks. shrikes, bluejays, hawks and owls, snakes, frogs and insects. The bulletin is illustrated with six plates and a number of figures showing the comparative amounts of the different food items taken by different natural enemies.

As controllers of life, natural enemies have an important place in the economy of nature. It is well known to naturalists that in a state of nature the natural enemies of any species are as essential to its welfare as are food, water, air and sunlight. Unthinking people are slow to realize this, as they see only the apparent harm done by the so-called rapacious creatures, and fail to observe and reason far enough to perceive the benefits that such creatures confer upon the species on which they prey.

Insect-eating, fish-eating and flesh-eating animals are essential in the great scheme of nature, as they serve to check the increase and regulate the numbers of other species, which in turn, when so regulated, tend to perform a similar office for vegetation. Thus these predatory creatures may be regarded among the chief controllers of life upon this planet. Man, the savage, of course must be included among them, and civilized man, if guided by reason and wisdom rather than greed or folly, may exercise a beneficial control over many of the lower animals.

Among the menaces pointed out in the methods of controlling natural enemies is the introduction of foreign species which tend to destroy the balance of nature, and the bounty system, which, with few exceptions, has proved a failure. Bounty laws tend to encourage the use of guns in the fields at all seasons of the year and they continually encourage fraud. As evidence of the fraud which is sure to appear Mr. Forbush quotes Dr. Jos. Kalbfus, secretary of the game commission ot Pennsylvania, as saying that many men are willing to commit perjury for a dollar. One man claimed to have killed 102 goshawks in four days in July, when this bird is only found in Pennsylvania in autumn, winter or early spring. Many frauds such as this have been perpetrated in the state of Pennsylvania since the bounty system took effect.

In recapitulating, it may be said that this bulletin shows that (1) natural enemies of birds are necessary and desirable, as they tend to maintain within proper bounds the numbers of the species on which they prey; (2) organized attempts to increase the numbers of birds over large areas by destroying indiscriminately all natural enemies are undesirable; (3) under certain circumstances enemies which have been able to adapt themselves to man and his works and have become unduly numerous may require reduction in numbers; (4) individuals of useful species which may become particularly destructive should be eliminated; (5) self-interest on the part of the people most concerned eventually will bring about such reduction of predatory animals as is needed without the stimulus

of bounty laws, which in most cases are pernicious and which if enacted at all should be directed only against the larger predatory animals or those which are dangerous to human life or exceedingly destructive to domestic animals or crops.

LAWS RELATING TO FUR-BEARING ANIMALS, 1916.

Pursuant to custom, started several years ago, the Bureau of Biological Survey has issued a bulletin entitled "Laws relating to fur-bearing animals, 1916," which has been issued as Farmers Bulletin 783. This report is a summary of the laws in the United States and Canada relating to trapping, protection, propagation and bounties of fur-bearing animals.

The introduction is of particular interest: "The value of the raw fur production of the United States and Canada has grown enormously in spite of the steadily diminishing supply of animals that furnish the finer pelts. In 1915 trappers of North America earned by their industry probably not less than $20,000,000, a remarkable sum when it is remembered that exports of raw furs were only about half the normal proportions. Conditions of the trapping industry have been greatly improved in recent years by legislation protecting fur animals in much of the territory where the business is important. As with game laws, each year brings changes in the trapping regulations, and it becomes important that the rights and privileges of trappers, as well as the limitations placed on their calling, be made plain. The present bulletin is designed for this purpose. It gives a brief review of changes made by legislative enactments of the past year, a summary of trapping regulations now in force, followed by short statements of the open seasons for taking furs, provisions relating to propagation of fur animals, and bounties offered for the destruction of predatory species, or those considered harmful. These are given by states and provinces, arranged in alphabetic order."

The larger part of the bulletin is devoted, therefore, to a systematic treatment of the laws in each state, followed by a summary of fur protection, giving under the different species of fur-bearing mammals a table showing the length in days of open season for trapping various fur animals.

That California is lagging behind as regards protection for fur-bearers is evident by the following facts brought out in the bulletin: The mink has a closed season in Alaska, in twenty-four states and in nearly all of Canada; the skunk has a closed season in eighteen states; the raccoon in nineteen states; and the fox in eleven states. Not one of these fur-bearers is given protection in California.

The bear appears to be given poor protection everywhere. Only four states now have a closed season and a few of the states either forbid trapping or regulate it. In giving protection to bears California could be one of the leaders and it is hoped that this opportunity will not pass unheeded.

The bulletin above reviewed comes at an opportune time, for it will give much necessary data in connection with the attempt being made to give fur-bearers in this state the protection which they need during this session of the legislature.

DEATH CLAIMS TWO NOTED SCIENTISTS.

During the past year death has claimed two noted ornithologists. Professor Wells W. Cooke, in charge of the migration investigations of the United States Biological Survey, died at his home in Washington, D. C., March 30, 1916, from acute pneumonia. No man in the United States knew more about the migration of North American birds. The notes of hundreds of observers throughout the United States were annually compiled and the data thus obtained form a basis for many valuable publications dealing with bird migration. The distribution and migration of different groups of birds were treated in separate bulletins. Consequently we find such titles as "Distribution and migration of North American shore birds" (Biol. Surv. Bull. 35), "Distribution and migration of North American herons and allies" (Biol. Surv. Bull. 45), "Distribution and migration of North American rails and their allies" (Bull. U. S. Dept. Agric. 128). The most important general paper, one which sums up the present day knowledge of the migration of North American birds, treating of such subjects as causes of

migration, records of migration and speed of migration, is the one entitled "Bird migration" (U. S. Dept. Agric. Bull. 185). One of Professor Cooke's published articles entitled "Our greatest travelers" (Nat. Geog. Mag., 1911, 346–365), attracted wide attention and is one of his best known publications.

In the death of Professor Cooke those have lost the man foremost in research on migration. What younger worker will be able to continue the work so ably carried on by Professor Cooke still remains to interested in the birds of North America be seen.

Another ornithologist more closely related to work in California died at his home, Branchville, Maryland, October 1, 1916. This was Professor Foster E. L. Beal, assistant, United States Biological Survey, a man noted for his work in economic ornithology. Our first definite information on the foods of birds in California was the result of the work of Professor Beal, who for several years studied the relation of birds to fruit-growing in California.

The economic work of Mr. Beal came at a time when any esthetic or economic value that a bird might have was entirely overshadowed by depredations made more obvious by the conditions existing in a new country. The bringing under cultivation of large areas together with the consequent destruction of native food plants forces the birds to turn their attention to the substituted field crops and exotic trees and shrubs. The comparatively small amounts of this new food supply, which supplants the native one, results in more apparent destruction of cultivated crops. The dry summers form another factor in California conditions, for juicy fruits prove an acceptable substitute for water. With no regard for inherent values or protective measures, farmers formerly resorted to the gun and harmful and beneficial birds alike met the same fate. This was the situation when the bulletins on the food habits of California birds appeared.

The evidence brought forth in the bulletin "Birds of California in relation to the fruit industry," published in two parts (U. S. Dept. Agric. Bur. Biol. Surv. Bull. 30 and 34), so clearly showed the economic value of California birds that there was a noticeable change in the attitude of the ranchers of the state. Many other bulletins have shown the dollars and cents value of California birds and to Mr. Beal must be given credit for being the first one to show the economic relations of California birds and to develop interest in the protection of the insectivorous birds beneficial to agriculture. For twenty-five years economic ornithology has been enriched by the investigations of this tireless worker who laid the foundations of economic ornithology in California.

HATCHERY NOTES.

W. H. Shebley, Editor.

MOUNT SHASTA HATCHERY.

After the completion of the distribution of trout fry from the different hatcheries of the state during the fall of 1916, the stations were put in shape for the coming season's operations.

This work was completed at Mount Shasta Hatchery during the month of December. During the month of November the first eggs of the eastern brook and Loch Leven trout were taken from the adult fish in the ponds. Operations were continued throughout the month of December and approximately 1,500,000 eggs of each variety of trout were secured. About 150,000 eastern brook eggs were also received at Mount Shasta Hatchery from the Marlette-Carson operations in the state of Nevada.

Six million quinnat salmon eggs were shipped to Mount Shasta Hatchery from the United States Bureau of Fisheries stations on Battle Creek and Klamath River. These eggs hatched out during the month of January and the fore part of February. They have been given careful attention and the oldest of the fry have now reached the swimming stage. When they have been reared to the proper age, a portion of the fry will be returned to the Klamath River, plants made in the upper reaches of the Sacramento River

tributary streams in the vicinity of Sisson, and the remainder will be transferred to the large rearing ponds and lakes of the Mount Shasta Hatchery. Those retained in the lakes and rearing ponds will be fed during the spring and summer months and liberated in the Sacramento and Klamath rivers after the first rains in the fall, when the condition of the streams is most favorable for their journey to the ocean.

Additional facilities for the rearing of quinnat salmon at Mount Shasta Hatchery are being provided. The Commission has leased from the Sisson Tavern Company the large artificial lake situated a short distance south of Mount Shasta Hatchery grounds, known as Sisson Lake. With the acquisition of this large body of water for a rearing pond for the quinnat salmon, this important branch of the Mount Shasta Hatchery operations will be greatly facilitated, as it doubles the capacity of the salmon rearing ponds.

FORT SEWARD HATCHERY.

A half million quinnat salmon eggs were hatched at Fort Seward Hatchery during the latter part of January. Previous to the receipt of this shipment of eggs, Fort Seward Hatchery had been fitted up for fishcultural operations for the season of 1917. The construction work commenced during September of last year, and the repairs to the hatching equipment were completed during the fore part of December. The salmon eggs are all hatched out and the fish are in excellent condition. As soon as the fish have reached the free swimming stage, they will be distributed in Mad and Eel rivers, Humboldt County.

As soon as steelhead trout eggs are ready for shipment from the eyeing stations, an ample supply will be shipped to Fort Seward Hatchery for stocking the streams of Humboldt and Mendocino counties.

MOUNT SHASTA AUXILIARY STATIONS.

Owing to the extreme drought throughout the state during December and January, the egg collecting operations were delayed until late in February. On February 1 a crew was sent to the stations at Bogus and Camp creeks, on the Klamath River. These two plants

Fig. 30. Hatchery A and breeding ponds at Mt. Shasta Hatchery. Photograph by G. H. Lambson.

were put in shape for the season's operations, but it was not until the latter part of the month that the large Klamath River rainbow trout commenced to run. The first spawning of the season was on February 17, when 120,000 eggs of this species of trout were taken. The storms throughout the northern part of the state increased the run of fish into the tributary streams of the Klamath River, where our egg-collecting stations are located, and the take of rainbow eggs now promises to be very good.

operations and very little work was necessary in the way of improvement. The hatching troughs were repainted, and a few minor repairs made to the building and hatching paraphernalia. The first steelhead trout eggs were received from the Scott Creek Station on February 20.

SCOTT CREEK STATION.

As in the streams of the northern part of the state, the run of fish in Scott Creek was delayed over a month, owing to the extreme drought. The steelhead trout

Fig. 31. Steelhead fishing on the Eel River.

ALMANOR HATCHERY.

On March 1 a crew of men will be sent to Lake Almanor, Plumas County, to open up the Almanor Hatchery, and Domingo Springs egg-collecting station. With the improvement in the Almanor Hatchery buildings, traps, etc., and the addition of the egg-collecting station at Domingo Springs, excellent results should be obtained from the fishcultural operations in Plumas County this season.

BROOKDALE HATCHERY.

Under the terms of the agreement entered into between the board of supervisors of Santa Cruz County and the California Fish and Game Commission, the Brookdale Hatchery was taken over by the commission on January 1. The hatchery was in excellent condition for

usually commence to run during the month of January, but this season it was not until February 20 that the first lot of eggs was taken. It was feared that our take of steelhead eggs this season would be very light; but with the heavy storms of the past ten days we are almost assured of at least an average take of eggs at Scott Creek Station.

SNOW MOUNTAIN STATION.

Whereas large numbers of steelhead trout are reported in the Eel River a short distance below the Snow Mountain dam, but very few fish have been taken in the traps at this station. It is probable, however, that with the recent storms the fish will soon commence to run, and our season's take will be satisfactory.

TAHOE HATCHERIES.

Preparations are now being made to open the Tahoe hatcheries at the usual time this season. Arrangements are under way to open the egg-collection station at Tallac on March 18.

MOUNT WHITNEY HATCHERY.

On January 21 the construction of Mount Whitney Hatchery was completed by the Department of Engineering and the plant was turned over to representatives of the Fish and Game Commission.

Fig. 32. Mt. Whitney Hatchery as it appears completed.

Previous to our taking over the hatchery, we had ordered all necessary supplies for the construction of all fishcultural equipment used in the operation of the hatchery, as well as paint for painting the hatching troughs. Therefore, we were prepared to go right ahead with this work. A portion of the hatching troughs have now been painted, and work is being rushed on the baskets, trough covers, etc. The hatchery will be ready for operations in ample time for the carrying out of our plans for the work this spring and summer.

With the Mount Whitney Hatchery and the auxiliary station at Rae Lakes in operation, the work of stocking the streams of southern California and the San Joaquin Valley as far north as the Yosemite Valley, will be greatly facilitated.

BEAR VALLEY HATCHERY.

During the month of November all necessary repair and improvement work preliminary to the operation of the Bear Valley Hatchery during the season of 1917, as far as could be undertaken during the winter months, was completed. All that remains to be done when the crew reaches the station is to set up the hatching troughs and install the racks in the streams tributary to the lake. The water in Big Bear Valley Lake is at a high level this season, and our operations should be very successful. It was expected that our crew could make the trip into the lake about March 1, but the recent storms and heavy fall of snow will probably prevent their making the trip before the 10th or 15th of the month. However, this slight delay should not interfere greatly with the prosecution of the work of egg collecting, as the fish do not start to run in great numbers before the middle or latter part of March.

UKIAH HATCHERY.

Ukiah Hatchery will be operated as usual this season. Steelhead trout eggs will be shipped to this hatchery from the Snow Mountain station, and the fry will be distributed in the streams of Lake, Mendocino and Sonoma counties. It is our intention to ship the first lot of eggs ready for shipment from Snow Mountain to Ukiah this season, in order that the distribution of the fish can be made as early in the summer as possible.

CONSERVATION IN OTHER STATES.

OREGON CONTEMPLATES INCREASE IN ANGLERS' LICENSE.

A number of the anglers of Oregon are advocating an increase in the price of angling licenses with the proviso that the additional fifty cents be set aside in a fund to be used exclusively in trout hatchery work. Whether the license will be raised from $1 to $1.50 will depend upon the extent to which anglers support the suggestion.

THIRTY FATAL HUNTING ACCIDENTS IN PENNSYLVANIA.

Thirty lives was the toll taken by the hunting season of 1916, although the total accidents were only 102, considerably less than the total accidents of 1915, of which twenty-nine resulted in fatalities. The decrease in the total number of accidents and the fact that no one was mistaken for game is accredited to widespread publicity against promiscuous shooting.—*Pennsylvania Sportsman January*, 1917, p. 15.

WANTED, BY NEW MEXICO SPORTSMEN.

1. An efficient nonpolitical *game warden.*

2. The passage of the Game Refuge Bill—with the *scalp of the Mondell Amendment* attached.

3. A law tacking the Federal Migratory Bird Law to the Canadian Treaty. Such a law will wipe out the last chance of the *spring-shooters.*

4. A *federal* fish hatchery for New Mexico.

5. Nationwide action to wipe out the last trace of *market hunting.*

6. Amendments to the state law simplifying the seasons, bringing it into conformity with the Migratory Bird Law, and authorizing the governor to proclaim temporary local closed seasons on any species on any area at any time.—*The Pine Cone*, January, 1917.

UTAH BIRD SANCTUARY.

In an effort to save the rapidly disappearing wild bird life of the state, arrangements have been completed for the establishment of Utah's first bird sanctuary, to cover an area of 700 acres. The use of the land is given free virtually to the state by property owners of the big cottonwood district, about four miles east of Murray.

State Fish and Game Commissioner Chambers will place quail and pheasants on the land, and his deputies will sprinkle feed there when the heavy snows of winter make it difficult for the birds to find anything to eat.—*Blue-Bird*, December, 1916.

GAME WARDENS TO BE UNIFORMED.

The wardens of the Conservation Commission of New York are to wear uniforms hereafter. The orders have been given because the commission believes that a uniform as a means of identification is appreciated by the public.

That a game warden be easily identified by people is important, but there is danger that the wearing of a uniform will afford a ready identification to the violator. Most states have thus far avoided the uniform and have believed more largely in the "plain clothes man" as an effective game warden.

SIXTH NATIONAL CONSERVATION CONGRESS.

Among the resolutions passed by the Sixth National Conservation Congress, held in Washington, D. C., on May 4, 1916, were those favoring the Chamberlain-Hayden bill and the Federal Migratory Bird Law. The following recommendations in the interest of aquatic life were also made:

a. That the states prohibit the unnecessary polluting of public waters;

b. That the fisheries in interstate waters be regulated by uniform laws, with the consent of Congress, not to be changed by one state without the concurrence of the other states affected.

c. That increased attention be given to the cultivation of fish in ponds on farms;

d. That the states take such action as will prevent the destruction of fish life in connection with irrigation.—*Recreation*, August, 1916, p. 78.

MINNESOTA ATTEMPTS TO REAR PHEASANTS.

The Minnesota Game and Fish Department reports that progress is being made in the propagation of pheasants at the Big Island Game Farm, recently established. About 1,200 eggs were secured from the thirty-six ring-necked pheasant hens, and eggs were also secured from prairie chickens and quail. As has been the rule elsewhere, a considerable toll was taken by crows and owls, and poachers and trespassers caused some injury to nesting birds. All of the young birds reared will be available for distribution in game refuges only.

LIFE HISTORY NOTES.

MORE BANDED DUCKS TAKEN IN CALIFORNIA.

During the 1916 open season, as in years past, several ducks originally banded in Utah have been taken in California. Mr. Chris Krempel killed a banded green-winged teal at the Greenwing Gun Club in Orange County during December, 1916. A report from the United States Biological Survey stated that the bird had been released at Bear River, Utah. On December 16, A. J. Buckley killed a green-winged teal at Los Banos, Merced County, bearing a tag numbered 3889. This bird was banded at Bear River, Utah, September 11, 1916. Another duck, banded at the same place on October 3, was killed by Henry Schubelhut at Brito, Merced County. S. G. Davis killed another teal bearing the number 4138 at the same place during January.—H. C. Bryant.

THE WOLF-EEL TAKEN IN SAN FRANCISCO BAY.

A fine example of the curious and interesting fish, the wolf-eel, was taken in San Francisco Bay, off Angel Island, February 13, by John Peetz and Bert Lake. The wolf-eel is a long, slender fish, bearing a superficial resemblance to an eel, but in reality not at all related to the eel. Its head is strong, its mouth filled with very strong conical canine teeth, the roof of the mouth being filled with rows of coarse molars. The head is only about one-eleventh of the total length of the fish. The dorsal and anal fins are very long, each of about 250 rays. The fish reaches a length of five to eight feet, and was one of the first, if not the first, species to be described from San Francisco Bay.

The first naturalist to study the fishes of this region was Dr. William O. Ayres, a charter member of the California Academy of Sciences. In 1855 Dr. Ayres obtained a specimen of this fish, which he described in the first volume of the Proceedings of the Academy. The fish was not only a new species, but it represented a new genus as well (*Anarrichthys ocellatus*).

The wolf-eel feeds chiefly on sea-urchins, sand dollars and the like. Although not often used as food, probably on account of its rarity, as well as its repulsive appearance, its flesh would no doubt prove nutritious and palatable if served in attractive form.—Barton W. Evermann.

SEA OTTERS SEEN NEAR MONTEREY.

Two sea otters were seen basking in the sun in the kelp beds off Del Monte between Seaside and Del Monte wharf on October 22, 1916. They were apparently an old and young one, and the theory is that the old one came back to look for one of her young which was caught in a sea bass net last year.—P. H. Oyer.

WILD SWANS ABUNDANT.

Apparently there was a great increase in the numbers of wild swans (*Olor columbianus*) visiting this state this past winter, 1916–17. All of the gun clubs in the Suisun district report the presence of swans on the duck ponds. One of the members of the Cygnus Club stated:

"Before daylight the air was very still and cold. The musical trumpeting of the swans could be plainly heard. As the members of the various clubs wended their way to the blinds for the morning shooting these great birds rose from the ponds where they had been resting and feeding, and circled the marsh, filling the air with their beautiful notes. The wild swan's note is one of the most plaintive and musical of all known birds."

I was on the marsh the same morning and should judge there were several hundred birds in small flocks circling in the air.—M. Hall McAllister.

WHITE MALLARDS.

A white mallard duck, the only albino mallard reported during the past open season, was killed in December, 1916, near Live Oak, California, by Sam Lamme, keeper of the West Butte Country Club. The bird, a male, has been mounted and is on exhibition at the clubhouse. Newspaper publicity has uncovered the fact that another mounted specimen of an albino mallard is in the possession of Colonel J. W. Dorsey of San Francisco. Still another specimen, a female, taken at Gridley, Butte County, several years ago, is in the collection of the California Museum of Vertebrate Zoology.—H. C. Bryant.

BIRDS LOSE THEIR WAY IN FOG.

During the early part of October several reports appeared in newspapers that numerous song birds alighted on ships far off the coast during heavy tule fogs. Most of the references to the kind of birds alighting on ships were couched in such generalities as: "hawks, blackbirds, sparrows and crows." Although we have attempted to secure more specific information the following facts only have been verified.

A large number of birds, of several different species, alighted on the Danish motor ship "Chile" when sixty miles off the Golden Gate, in October, 1916. One of the birds, obtained and held in captivity for a short time by Mrs. M. C. Terry, from a detailed description appears to have been a spurred towhee (*Pipilo maculatus*).

Dr. M. C. Terry, of the United States Public Health Service, saw a number of English sparrows and a warbler of some sort on the deck of the Norwegian steamship "San Joaquin," which docked on October 21, 1916. These birds were said to have come aboard the ship when it was off the lightship, about ten miles off "the heads." The pilot of the ship reported that blackbirds and a small owl also came on board.

On the same day the captain of the British steamer "Dunstan," sixteen days from Panama, reported that many different kinds of birds alighted on the ship from ten to twenty miles off shore. He estimated that as many as 200 birds were on the ship at one time. Some of them were quite tame and lit upon his arms and shoulders.

The above information, although lacking in scientific detail, still points to the fact that many land birds occur at some distance off shore, especially during heavy fogs. The taking of such a permanently resident species as the spurred towhee many miles off shore is of more than ordinary interest.—H. C. Bryant.

ANTELOPE APPEAR IN NEW LOCALITY.

On September 9, 1916, I saw one antelope (*Antilocapra americana*) at Coon Camp Flat, in the northern part of Lassen County. There were tracks of two more smaller ones that I did not see. Twenty years ago antelope were quite plentiful in this locality, but for a good many years none has been seen there. There are several bands in the eastern part of the county.—F. P. Cady.

Fig. 33. Boat load of sardines and unloading sardines at San Diego. The sardine run has been unusually large this past winter. Photographs by Webb Toms.

SEA OTTERS NEAR CATALINA ISLAND.

On March 18, 1916, 31 sea otters, two being young ones, were seen to the south of Catalina Island. Although one has occasionally been seen in this locality before, this was the largest number, to my knowledge, counted at one time.—Geo. Farnsworth.

THE LEOPARD FROG IN CALIFORNIA.

Mr. George Neale has recently called to our attention the fact that the leopard frog (*Rana pipiens*) is now to be found commonly at Lake Tahoe. The attempt of Mr. Neale to obtain exact information as to the introduction of this frog into the state has not been productive of detailed information, but evidence that it was introduced is at hand. Mr. George T. Mills of the Nevada Fish and Game Commission reports that the leopard frog is found commonly at Washoe Lake, a few miles south of Reno, Nevada, but that no one appears to know whether or not they were introduced here. A restaurant man is said to have introduced the leopard frog into the Carson Valley reservoir, near Reno, where it is now very common. According to Lawrence and Comstock of the New Brockway Hotel and Hot Springs, Brockway, California, this introduction took place about eight years ago. A short time after these frogs were planted the reservoir broke and Lawrence and Comstock secured one hundred dozen, which were planted at Tallac. Here they have increased rapidly in spite of the cold winter weather.

The regular occurrence of this frog in the markets of San Francisco and the constant attempts to introduce it into other suitable localities in this state make it important that all information as to introductions of this kind be recorded so that a history of attempts at introduction in this state will be available.—H. C. Bryant.

UNITED STATES FOREST SERVICE COOPERATION.

L. H. Whiteman, Editor.

GAME REFUGE PLAN SUCCESSFUL IN NEW MEXICO.

The proposed game refuge plan is approved in New Mexico. A report given out by the Forest Service there confirms the theory that deer will quickly recognize and take advantage of areas protected against hunters. According to the report made to the district forester at Albuquerque, M. L. Cadwallader, owner of a large pasture in one of the national forests, forbade it to hunters. The deer at once flocked to the pasture, and, it is said by the local forest ranger, now to contain more deer than all the rest of the district. In commenting upon this, the district forester said in part:

"The instance is said to be valuable in that it confirms the theory of the game refuge now before congress, which authorizes the establishment of a system of protected areas throughout the national forests of the entire West. The theory of the plan is that game will find refuge in the protected areas, where it will increase and overflow into the surrounding country, thereby improving the hunting outside. The refuges will also afford a means for preventing the extermination of rare species like mountain sheep and antelope, and it is claimed will relieve the present shortage of buck deer.

"The national game refuge bill, based on what is known as the Hornady plan, failed of passage at the last session of congress, in spite of widespread popular support. It is said that every game protective association and almost every chamber of commerce and stockmen's association in New Mexico heartily endorsed it. Sportsmen and forest officers are hoping that it will be enacted into law by the present congress so that the work of establishing a system of game refuges can go forward."

THE AUTOMOBILE A FACTOR IN GAME DECREASE IN EL DORADO NATIONAL FOREST.

The exceptionally fine recreational advantages to be had in the Sierra Nevada Mountains within the El Dorado National Forest draw many thousands of tourists, campers and sportsmen to the streams, lakes and favored hunting areas during the hunting and fishing season. The automobile has supplied a long felt want of rapid transportation for sportsmen and has resulted in an increased

amount of fishing and hunting. This in turn has to a considerable extent resulted in a decrease in the number of wild game, especially deer, quail and grouse. Except in the higher mountains, remote from roads and trails, there is annually a decided reduction in the number of grouse. Mountain quail are also decreasing slowly but surely. The number of bucks reported killed annually during the open season (not including the number of does and fawns that are killed, and bucks out of season, and all species killed by predatory animals) is, no doubt, exterminating the deer quite rapidly.

The proposed establishment of game refuges by the federal government in cooperation with state legislative enactment, will aid materially in the propagation of wild game. Three refuges are proposed for the El Dorado National Forest, located in the extreme northern, extreme southern and central portions, all bordering on or near the western boundary and extending far enough east to afford game protection during summer and winter.—E. J. KOTOK.

SUGGESTED CHANGE OF PRESENT TROUT LAW.

As the number of fishermen increase along the north fork of Eel River it becomes more and more noticeable that the classing of the Eel River steelhead as a trout is working some hardship on the sportsmen. As the law is now, the limit is 50 fish, or 10 pounds and one fish, or one fish of 10 pounds or over. As very many of these fish weigh over 10 pounds, a sportsman catching one of, say, 11 pounds weight, would be obliged to stop for the day. This, it seems to me, is somewhat of an injustice, and I would suggest some plan whereby the limit would be three fish per day regardless of weight.—C. V. BRERETON.

SQUIRREL POISON AND RATTLESNAKES.

The statement in the October number of CALIFORNIA FISH AND GAME that the eating of poisoned squirrels will kill rattlesnakes appears to have been questioned. Here is an incident I give for what it is worth:

The members of Camp No. 1, of the Biological Survey, on the California Forest last year, found a rattlesnake writhing in a fit and half dead. Upon killing the snake they found it had swallowed a squirrel and they readily determined that the squirrel had been eating poisoned grain. It is probable that the squirrel was not dead when seized by the snake, but at any rate it seems positive that the strychnine will kill rattlesnakes. In connection with this, the records of the Covelo District for the past seven years show definitely that the snakes are decreasing in number.—C. V. BRERETON.

TROUT PLANTING IN THE SANTA BARBARA NATIONAL FOREST.

Through the efforts of Forest Supervisor Hall a number of streams in the Santa Barbara National Forest were stocked last autumn with trout fry supplied by the Fish and Game Commission. In each case the fish were planted above impassable falls where no fish were to be found. Bouquet Canyon received 4,000 eastern brook; Lime Canyon, a branch of Cachuma Canyon, received 2,500 rainbow and 25,000 Loch Leven; Rincon Creek received 5,000 steelhead.

REPORTS.

CALIFORNIA FISHERY PRODUCTS FOR THREE MONTHS ENDING DECEMBER 31, 1916.

Species of fish	Del Norte and Humboldt	Sonoma, Mendocino, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco, San Mateo	Santa Cruz	Monterey	San Luis Obispo Santa Barbara, Ventura	Los Angeles	Orange	San Diego	Other counties	Mexico	Totals
Albacore											4,568,088		37,444			4,605,532
Anchovy								1,500	191,170		2,900					195,570
Barracuda										2,500	185,470	1,168	2,130		338,218	520,486
Bonito										1,003	117,550	440	53,847		14,715	187,555
Bocaccio							2,390		51,305							53,659
Bluefish																
Chilipepper							8,799		42,758							51,557
Carp				4,849	9,367	18,348										32,564
Catfish		9,241		10,616	23,397	3,027										46,281
Coalfish						2,580		7,560	19,399							29,539
Cultus cod	18					121,719		49,931	51,881							223,549
Dogfish									165		1,200					1,365
Flounder	494		1,668			532	5,411				320		200			8,625
Halibut	5,709						540	1,800	1,847	41,012	33,201	8	34,045		915,344	1,033,006
Hake							30,390	12,650			7,042	201			6,847	57,130
Herring	716		84,970					100	51,930		1,295					139,011
Kingfish							330	5,650	9,123		139,440		1,820			156,363
Mackerel								15	501	30,126	279,119	605	55,706		50,154	416,226
Mullet														10,447		10,447
Pike				14	50	5,001										5,065
Pompano							28		11		1,957					1,996
Perch	19		10,683						260		66,667	10				77,642
Rock bass											74,515	1,949	43,203		18,362	138,029
Rockfish	523						223,302	237,373	357,462	20,016	521,631	467	82,304			1,443,078
Sole							1,078,428	457,992	11,911		75		330			1,548,736
Salmon	1,842,624	3,495		33,041	13,700	744,517		1,699	88,530							2,727,606
Smelt	25,183		2,083					12,843	40,571	10,930	114,562	72,125	45,183			323,480
Sea bass (white)			4,736					620	2,193	10,968	39,774		1,560		69,208	129,059
Sea bass (black)											7,645	160	60,034		23,161	91,000
Sand dab							322,580	162,580	1,814		3,594					490,598
Striped bass		207		16,530	37,834	162,322								207		217,100

Shad				5,771		207,426										213,197
Sturgeon						387										387
Sardine			2,370					16,715	6,301,050		2,374,855		2,318,698			11013,688
Skate							9,130	240				69				9,439
Sculpin											4,136					4,136
Sea trout												120				120
Tom cod							300									300
Trout (lake)													244			244
Trout (steelhead)	28,880															28,880
Turbot			20													20
Whitebait			8,946													8,946
Yellowtail											336,205	522	56,194		16,141	409,062
Miscellaneous			62		1,054	4,196	11,764	38	9,239	601	150,160	302	2,006	143	152	179,717
Total fish	1,904,166	12,943	115,541	70,821	85,402	1,270,055	1,693,392	969,306	7,232,650	117,156	9,031,401	78,146	2,794,704	11,041	1,452,302	26839,026
Crab (doz.)	1,170						15,187	1,208	926							18,491
Spiny lobster										12,270	65,500	10,064	53,023		36,226	177,083
Shrimp							106,013									106,013
Ecrevisse																
Squid								177	37,097		6,973	507	380			45,134
Cuttlefish							2,358	1,402	632							4,392
Clam (Pismo)								3,716		38,863						42,579
Clam (cockle)			2,517								6,177					8,694
Clam (softshell)		1,320	86,026			22,602	7,680									117,628
Clam (mixed)	10,938	240	3,080					1,585			160					16,003
Oyster (shell), No.							1,146,700									1,146,700
Abalones			2,685					270	117,040	1,675						121,670
Mussels										510	15,228					15,738
California oysters			845													845

VIOLATIONS OF THE FISH AND GAME LAWS.

December 1, 1916, to February 28, 1917.

Offense	Number of arrests	Fines imposed
Game.		
Hunting without licenses	30	$410 00
Deer, close season, killing or possession	23	560 00
Spiked bucks—illegal deer hides	5	175 00
Ducks, close season, killing or possession; excess bag limit	12	250 00
Shooting ducks from power boat in motion	8	55 00
Using a live or imitation blind	2	
Night shooting	2	50 00
Quail, close season, killing or possession	3	125 00
Shore birds—killing or possession	2	50 00
Nongame birds—killing or possession	14	144 00
Tree squirrels—killing or possession	1	25 00
Total game violations	101	$1,844 00
Fish.		
Angling without licenses	8	$150 00
Fishing for profit without licenses	9	50 00
Trout, close season; excess bag limit	9	370 00
Striped bass, underweight	1	
Black bass, possession, close season	2	30 00
Young of fish in possession	1	
Crabs, undersized	7	70 00
Clams—excess bag limit; undersized	10	43 50
Abalones—undersized	7	120 00
Lobsters—undersized and oversized	5	95 00
Seining within 750 feet of a wharf	6	25 00
Illegal fishing apparatus	24	510 00
Total fish violations	89	$1,463 50
Grand total fish and game violations	190	$3,307 50

SEIZURES—FISH, GAME AND ILLEGALLY USED FISHING APPARATUS.

December 1, 1916, to February 28, 1917.

Game.	
Ducks	2,418
Geese	483
Deer meat	652½ pounds
Cottontails	7
Quail	2
Nongame birds	15
Squirrels	1
Beaver pelts	6
Deer hides	1
Fish.	
Striped bass	498½ pounds
Salmon	264 pounds
Trout	435 pounds
Black bass	18½ pounds
Crabs	332
Clams	671
Abalones	69
Prepared abalone	353½ pounds
Lobsters	52
Miscellaneous fish	46 pounds
Nets	18
Fish traps	12
Set lines	1,500 feet
Chinese shrimp or bag nets	64
Searches.	
Illegal fish and game	38

STATEMENT OF EXPENDITURES FOR THE MONTHS OF OCTOBER, NOVEMBER AND DECEMBER, 1916.

	October	November	December
General Administration.			
General administration	$1,562 68	$1,599 39	$2,199 92
Research, publicity and education	387 94	203 53	288 67
Printing	389 77	202 50	
Fish exhibits	351 85	83 50	
Game exhibits	28 39		
Game farm	313 70	202 21	322 06
Mountain lion bounties	160 00	220 00	200 00
Lithographing hunting licenses			
Lithographing anglers' licenses			738 50
Hunting license commissions and refunds	2,939 50	876 20	2,198 60
Anglers' license commissions and refunds	1,432 50	669 90	1,281 70
Market fishing license commissions and refunds	181 00	36 50	
Totals	$7,747 33	$4,093 73	$7,229 45
Patrol.			
San Francisco District	$5,485 78	$5,018 66	$4,989 68
Sacramento District	3,567 36	3,435 12	3,336 10
Los Angeles District	2,045 68	1,996 05	1,767 41
Launch patrol	828 61	710 13	956 30
Prosecutions—fish and game	245 68	384 10	31 40
Crawfish inspection	100 00	100 00	100 00
Winter game feeding			
Accident and death claims	12 00		
Totals	$12,285 11	$11,644 06	$11,180 84
Department of Fish Culture.			
Hatchery administration	$868 90	$776 10	$816 42
Mount Shasta Hatchery	1,262 23	1,825 46	1,618 65
Mount Shasta Auxiliary Stations			25 00
Mount Whitney Hatchery	680 78	614 77	742 41
Mount Whitney Auxiliary Stations	336 91		
Tahoe Hatcheries	64 37	10 50	10 00
Tahoe Hatcheries Auxiliary Stations			
Marlett-Carson Hatchery	185 45	181 95	237 35
Fort Seward Hatchery	743 21	328 14	437 57
Ukiah Hatchery			
Snow Mountain Station	3 05	7 00	
Brookdale Hatchery			16 00
Scotts Creek Station	576 38	75 00	31 00
Almanor Station	1,072 48	239 26	6 00
Bear Valley Hatchery	32 87	155 67	8 75
Yuba City Shad Station	1 05		
Fish distribution	1,471 78	488 24	262 58
Fish transplanting	134 30		15 00
Screen, fishway, water pollution	539 51	535 15	505 70
Totals	$7,973 27	$5,237 24	$4,732 43
Commercial Fisheries Research and Patrol.			
Fishery research and patrol	$490 26	$513 85	$344 72
Grand totals	$28,495 97	$21,488 88	$23,487 44

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—*From drawing by Charles Bradford Hudson*

QUINNAT SALMON *(Onchorhynchus tschawytscha)*